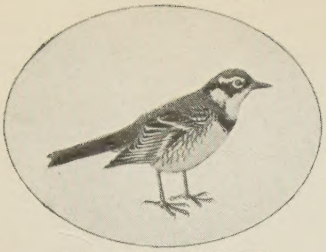
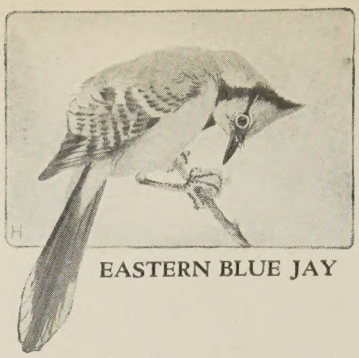
NATURE MAGAZINE

FEBRUARY 1931 35¢ VOL. 17, NO. 2

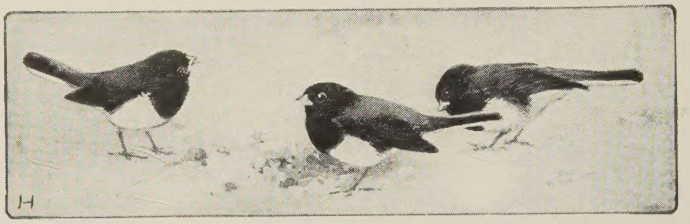


VARIED THRUSH



EASTERN BLUE JAY

THE CHEWINK



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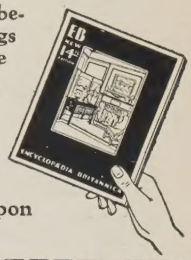

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Shakespeare Land

How the sun gleams, you muse, as you wander down a lane edged with dogrose and hawthorn. "And yes," echoes the road, "I knew the tread of Roman sandals." It winds onward through Royal Leamington Spa of "ye fyne waters." Past Kenilworth where Leicester and Queen Elizabeth romped and revelled. Over the green dales and billows of Warwick to Stratford-on-Avon. On Henley Street there is Shakespeare's perfectly preserved birthplace—the world's proudest house. The stairs may creak a welcome as you ascend to see the very room in which he was born. The flowers and shrubs in the garden shyly nod that they are the ones that Shakespeare described in his plays.

Harvard came to Stratford to woo Catherine Rogers and not far away stands her timbered sixteenth century house. Prince Rupert quartered in Stratford to meet Queen Henrietta, and King Charles II rode hard by on his romantic flight from Worcester.

Illustrated Guide No. 7 will be gladly mailed if you write to

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The Western Trips are Here Again!

Summer is on its way, and we were not able to resist the temptation of sitting down and dreaming of the winding trails, and the mountains lined with trickling waterfalls and topped with snow, and the alpine lakes nestled in unexpected hollows—and the deer along the lake, the mountain sheep outlined against the sky! And the best part of it was that we were not following motor roads, rushing from one place to another with only time to catch a brief glimpse of each new wonder. No. There were only a few of us, a congenial party drawn together by the common interest of our love for Nature and appreciation of her many-sided character. We took the trails to remote places, where few people are lucky enough to be able to go. We lingered in these places, growing to know them and to understand things that had been hidden from us before. Our eyes and minds were guided by a naturalist whose vast knowledge of all around him was a mystery in itself. We were able to forget the details of planning and business, since we had one member who attended to all such mundane matters. What a dream! Now after much planning and exploring, the American Nature Association is able to make that dream come true. It offers a series of trips through the ever-fascinating and alluring West, and with the assurance brought by two years' happy experience, it frankly states that these trips are distinctive not only because of the places they visit, but for the delightful camaraderie of the groups and the unforgettable experiences.

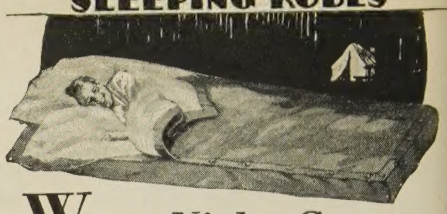
Guided by the popularity of certain trips in the past two years, we have included them again, with the addition of two or three new fields to explore. The trips as a whole are divided into two sections, one covering the Northwest and the other the Southwest. Each of these sections is divided into smaller ones, of a week or ten days' length; thus one with only a short time may take just one trip, while those more fortunate ones with a month or more at their disposal may combine four or five trips into one extended tour.

The first will begin in Jasper where we will follow the same trail as last year. We start with the motor ride up by Maligne Canyon to the end of Medicine Lake, where we transfer to a launch. At the other end of the lake those who are so inclined become acquainted with the horses they will have at their disposal for several days. The others scornfully take to the trail on foot. Maligne Lake is our headquarters for a few days, and it is with regret that we leave it to head over Shovel Pass to the shores of Wabasso Lake, and thence back to the Lodge and civilization.

But this need not be the end of the trip. We shall go down to take a look at famous Banff and Lake Louise, and then, on horse or foot again as you desire, we brazenly

(Continued on page 74)

WOODS ARCTIC DOWN SLEEPING ROBES



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EDITED BY ROBERT T. LOWELL

Picture making The New Way with the Photoflash Bulb and the Rexo Hand Reflector. No open flame, intensely bright, quick flash, perfectly safe

WELCOMED

AMATEUR photographers are giving an enthusiastic welcome to the new Photoflash Lamp. It resembles an ordinary lighting bulb though it is filled with crumpled aluminum foil. When screwed into an ordinary lamp socket or into a household flashlight a very quick and intense flash of light results, when the current is switched on.

There is no open flame, no smoke and no fire hazard. Pictures (made instantaneously) about the home with ordinary inexpensive cameras may now easily be accomplished at night; or in the daytime. The family about the fireplace, the youngsters toasting marshmallows, Dad at the radio and little Jane playing with her dolls are but a few of the many picture chances that come to mind that will be so easy to capture with the Photoflash Lamp.

Many photographic stores throughout the country have this new light on hand. It is a product of the General Electric Company. If you cannot easily obtain them, write to the editor of this department for information on the nearest source of supply and for any other details that you may wish.

A Photoflash bulb is shown in the diamond shaped inset at the lower right corner of the picture above.

A camera made silhouette supplied the motif for this card

SILHOUETTES

SILHOUETTES by photography are in vogue today. Years ago—before the camera was invented—they were made by a few specialists by cutting with shears or by blocking in the image. Today anyone can make silhouettes with the camera and the likenesses will be true, for the camera lens is infallible.

Silhouettes indoors by flashlight, electric light or daylight are simply made. The basis of this phase of photography is merely to get an abundance of light on the side of the subject *away* from the camera so that the side *facing* the camera will be devoid of detail in the resulting negative. It is much simpler than it sounds.

If you are not successful in your first attempts at making silhouettes or if you would like complete information first on how to make them, a post card request to the editor of this department will bring complete details about this camera fun.

A flashlight picture of the beautiful night-blooming Cereus made with a Graflex camera by Fred Beidleman, San Diego, Calif.

NEWSY NOTES

Mostly Movie—Literature on Request

RUSSIAN films for home projection are offered by the Bell & Howell Company of Chicago, makers of the justly popular Filmo movie cameras. "Taming the Taiga", "Hunting and Fishing in Serbia" and "Changing Times in Afghanistan" are three of decided interest. Sound films are also available.

Kemco Homovies announces equipment that reduces the cost of making 16 mm. movies 75%. It is said that the new cameras require but one-quarter the usual amount of film—a 100-foot roll runs sixteen minutes in projection time as against the ordinary four minutes.

A new hand-held Aero camera known as the K-10 has been developed and is ready for distribution by the Folmer-Graflex Corporation, Rochester, N. Y., makers of the efficient Graflex cameras. The camera takes a roll of film giving twenty-five exposures of the 5 x 7 size. It sells for a remarkably low figure for this type of camera.

The perfecting of an anti-flicker shutter incorporated in the new Ciné Projector created by the Agfa Ansco Company is conducive to complete eye-comfort together with giving a clear, brilliant, steady picture image.

Eastman Kodak Company introduces the Kodatoy—a playroom projector for the youngsters which is furnished complete with a silvered screen theatre. Movie films of comedies, travels, cartoons and animal pictures may be obtained at small cost and the Kodatoy (not a toy in mechanical detail) is most reasonably priced.

Burleigh Brooks, New York City, is sole agent in U. S. A. for the compact Mirror-Reflex cameras, products of Franke & Heidecke of Germany. The Rolleiflex is the "one picture" camera, the Heidoscop is a Stereo. Precision and convenience are claimed. The image is focused in full picture size, right side up and may thus be viewed during and even after exposure. No chance for poor composition or out-of-focus results.

WHY SOME PICTURES ARE BLURRED

CONTINUING LAST MONTH'S ARTICLE

If you are not sure why some of your pictures are hazy or otherwise defective send them to the editor of this department. He will diagnose the case.

SUBJECT MOVED

If the subject moved during the exposure, only the portion in which there was motion is blurred, the rest of the picture remaining sharp. In the above example head and shoulders moved

SUBJECT OUT OF FOCUS

Here the girl—the most important element in the picture—is out of focus, while the trees in the background are sharp. The scale was set at 100 feet when it should have been set at 10

CAMERA MOVED

When the camera moves ever so slightly during the exposure the whole picture is blurred. To prevent this, keep camera steady and hold the breath for the instant when the shutter is operated

SHARP—CLEARLY DEFINED

Here everything is as it should be—the focus is correct, the camera was held steady, and the girl did not move suddenly when the shutter was "clicked," as in the first picture

Keep and Show Your Snapshots This New, Better Way.... ....with FOTO-TAINER!

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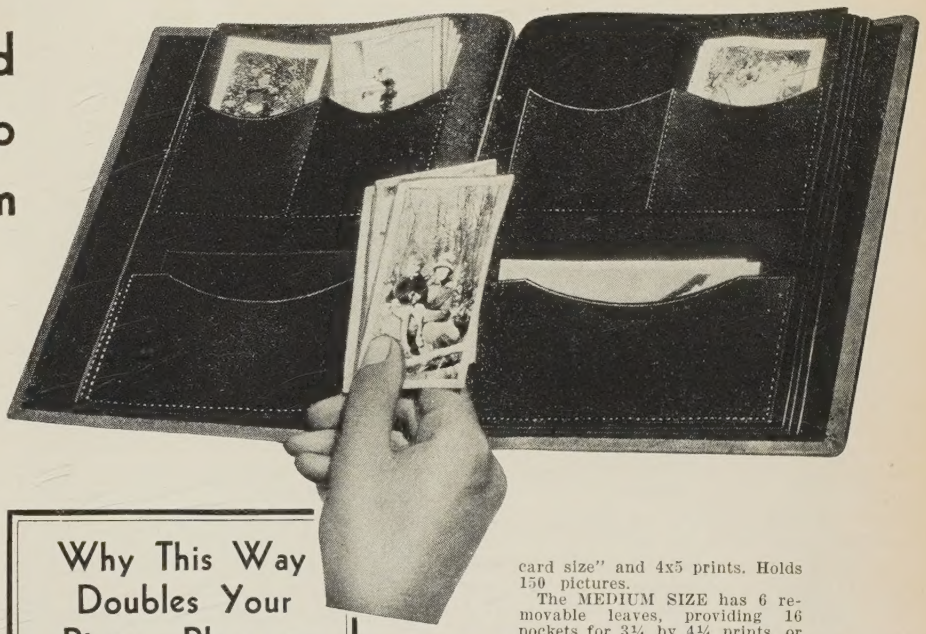

THE FOTO-TAINER way is so simple, easy and satisfying that it's a wonder nobody ever thought of it before. The handy packets of one compact FOTO-TAINER will take care of *six times as many snap-shots* as a much more bulky album—and the prints in each packet can be slipped out instantly to be "passed round."

People like to look over pictures if they don't have to hold and "wade through" a thick, heavy album. FOTO-TAINER enables you to keep pictures on each subject in separate packets, and hand each person just the prints he wants to see—your last vacation trip, the latest snaps of the baby, etc., etc. Several guests can thus look over your camera work at the same time. FOTO-TAINER gives *everybody* the maximum pleasure from pictures!

No More Messy Pasting!

Don't waste any more time and patience pasting up page after page of prints in a bulky, unhandy album—fussing with tabs—constantly having to fix pictures that come loose—and laboriously lettering titles with white ink or pencil. With FOTO-TAINER you can note titles quickly on the backs of the pictures, classify them in separate packets, and you're done. Besides, you can "weed out" those no longer interesting and *re-arrange your whole collection in a few minutes!* Also, the two larger sizes of FOTO-TAINER allow you to put in additional leaves as your stock of prints grows.

With a FOTO-TAINER you can take a greater pride in your pictures and win the admiration of your friends when you show them this new, *handier* way. And the handsomely bound FOTO-TAINER is a really decorative addition to your living room table.

Why This Way Doubles Your Picture Pleasure

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You pass the prints, not the album

Several people can see pictures at once

Special groups kept together

Snap-shots can be taken out and rearranged, or discarded, at any time

Keeps six times as many prints as an album

New leaves can be added

Negatives can be kept with prints, if desired

Examine any FOTO-TAINER 5 DAYS FREE

You cannot fully appreciate the convenience of this new way of keeping snap-shots until you actually see a FOTO-TAINER. That is why we have decided to send any size and style you choose for 5 days FREE EXAMINATION. FOTO-TAINER comes in 3 sizes and two qualities.

The POCKET SIZE has 6 stitched in leaves, providing 16 pockets for "vest-pocket" and 2¼ by 3¼ prints—and 4 pockets for "post card size" and 4x5 prints. Holds 150 pictures.

The MEDIUM SIZE has 6 removable leaves, providing 16 pockets for 3¼ by 4¼ prints, or smaller—and 4 pockets for 4½ by 6½ or smaller. Holds 400 pictures. (Extra leaves obtainable.)

The LARGE SIZE has 6 removable leaves, providing 36 pockets for 2¼ by 3¼ prints, or smaller—and 6 pockets for "post card size" or 4 by 5 prints. Holds 500 pictures. (Extra leaves obtainable.)

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We want you to see for yourself how much more convenient it is to preserve and show your snap-shots this new, better way—with the FOTO-TAINER. It will not cost you a cent to examine one or more. Simply check on the coupon the sizes, qualities, and prices of the models you want to see—and mail with your address. We will send the FOTO-TAINERS postpaid. If you do not find this the best way you ever saw of keeping snap-shots, send back the FOTO-TAINERS at our expense within 5 days and owe nothing. Otherwise send remittance within the trial period for the ones you decide to keep. Mail coupon today to MEVI, Inc., Dept. 12, 116 East 13 St., New York.

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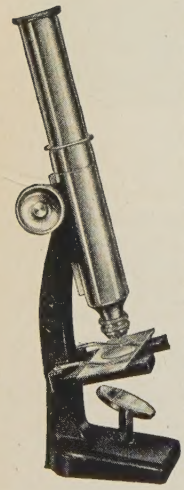

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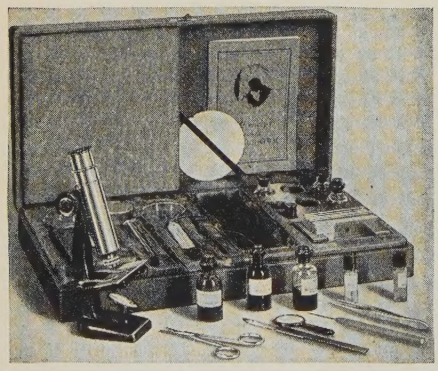

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TRAVEL DEPARTMENT

(Continued from page 70)

turn our backs on the crowd and head up into the mountains to spend several days exploring the beauties of Moraine Lake, Lake O'Hara, Yoho and Emerald Lake, following the glorious trails, so that when we leave we feel that we alone have seen the Canadian Rockies as they should be seen, but as they seldom are.

Of course we must have Glacier, and the next ten days will find us making the North Circle trip, starting from Many Glacier and switchbacking up over Swiftcurrent Pass, to Granite Park Chalet and the Garden Wall. What an introduction to Glacier Park! And the rest is not an anti-climax as we are soon convinced by the Sky Line Trail that leads us to Flattop and on down to Waterton Lake. Eventually we must head back for Many Glacier, but this time we go over Indian Pass to the shores of Crossley Lake, where we stop for more exploring for two days, before taking the trail over Red Gap toward Many and the outside world.

Yellowstone is still ahead of us, and with curiosity and wonder we view its geysers and formations. After several days of this we once more retire, this time to Camp Roosevelt on the edge of the Park. Here we make our headquarters for rides or hikes into the neighboring country with some special lake or falls for an objective. Now the Northwest trip is really over—for this summer—but we all know that we shall be back again, for once having seen it and loved it we can't break away from its spell,—even if we should want to try.

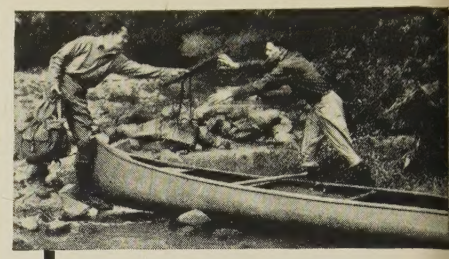
Meanwhile another party will have started out in California. Let's join them quickly in Yosemite where something distinctly different has been arranged. Instead of approaching the Park in the conventional way, the party will enter by way of Truckee, spending a day and a night at Lake Tahoe Tavern. Thence over the famous Tioga Road, following the route of the historic Fremont Trail, past Mono Lake and then up into the Sierra Nevada. First stop will be made at Tuolumne Meadows, most extensive of the high Sierra meadows, where the party will linger and get accustomed to the height.

From Tuolumne the trail leads away from the beaten track by way of Boothe Lake Camp, Merced Lake Camp, Glacier Point where, spread below, is Yosemite Valley in all its glory. Then down to the Valley floor itself—a trip properly placing the climax at the end instead of at the start. A day and one-half at Camp Curry, and then on again.

It would be unwise not to visit the great forest of the high Sierra at Sequoia when one is so near, so two days will be spent there, riding or hiking, fishing and drinking in the glories of this marvelous country. Thus two weeks will be spent in this wonderful land of California's mountains before those members of the party who are going on leave for Los Angeles and then turn eastward again.

From Los Angeles the trail leads to Bryce and Zion Parks, rich in fantastic formation and glorious scenery; along the Mt. Carmel Highway's great scenic route; to the north rim of the Grand Canyon, there to linger before we drop down for

SHE CAN TAKE IT ON THE NOSE!



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Such, in brief and most sketchily, are the trips of the American Nature Association's Vagabonds of the Trail for 1931. They are described in more detail in the new edition of "On Western Trails". This booklet will go automatically to all veteran Vagabonds, and to all who in the past have signified a desire to become such, by writing for information. If you are not one or the other of these, write to the Director of Field Trips, American Nature Association, Washington, D. C., because these vagabonding expeditions are well worth considering in planning your vacation trip for 1931.

Visiting England

Anyone who is planning a trip to England during the coming season, or, in fact, any time in the near future, will be interested in new descriptive literature and booklets issued by the Great Western Railway of England. These may be used as a good guide, offering suggestions as to where one may want to go. One booklet, entitled "England—and Why," is particularly enjoyable, since it not only gives a great deal of desirable information on various places and why they are worthy of a visit, but it presents them in such a fascinating way that it is almost impossible to resist their lure. One may reach the majority of these places either on the train or by means of one of the motor trips which are planned to include the important and most interesting spots in different sections on six-day, all-expense tours. Individual booklets describe and give brief historical sketches of Cornwall, Devon, the Shakespeare country, Somerset, Wales and Ireland. If you are interested in such a trip and would like to receive some of the literature, it may be obtained through the Travel Department, American Nature Association, Washington, D. C.

Forest Service History

The latest Service Monograph of the United States Government to come to hand from the Institute for Government Research of the Brookings Institution is *The Forest Service*. Having one of the most interesting histories—and, at moments, most turbulent—of our government bureaus, the history of the Service makes interesting as well as significant reading. The author is Darrell Hevenor Smith.

Botany Revised

Thomas Y. Crowell Company of New York have just published a revised edition of *General Elementary Botany* by Elmer Campbell, head of the Biology Department of Transylvania College. The new edition has been entirely reset and revised in accordance with general and specific suggestions offered by teachers, and has the benefit of having been tried out as a text, revised to improve it, and re-illustrated in some particulars. The retail price is three dollars.

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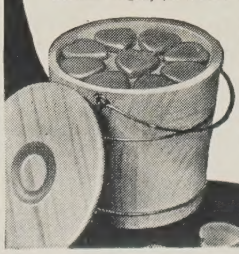

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NATURE MAGAZINE

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To Stimulate Public Interest in Every Phase of Nature and the Out-Of-Doors, and Devoted to the Practical Conservation of the Great Natural Resources of America

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The LIVING BIRD

An Editorial

IN ANCIENT times birds were little esteemed except for food, and among some peoples this attitude of mind is still predominant. But as we rise, even though slowly, from barbarism, we are conscious of a growing appreciation of the bird's beauty of song and habit, first expressed in an occasional passage in Holy Writ, or in the writings of the earlier poets. To a growing multitude the living bird has become a source of joy and inspiration, a symbol of beauty and freedom.

In our early years we all love birds; "Let me hold it in my hands", begs the child, if a helpless nestling or a wearied migrant comes its way. And so we have the Audubon Societies, and the Bird Study classes, all for the purpose of learning to recognize the bird in the wild, and becoming acquainted with its habits and its song.

Some birds remain with us all the year; others have learned to go to the tropics for the winter, and we watch for their return, and record the day of their home-coming. We piece together, bit by bit, the scattered facts we learn about them, and we put these on record, and are eager to discuss our discoveries with our friends of similar tastes. We set aside areas where certain species may find sanctuary. We have reserved an island in our Tropic forest that we may observe at close range its wild creatures. We spend many days or weeks in trying to photograph some shy bird, and feel repaid if we succeed. Many have discarded the gun for the camera, for a bird may be photographed many times, but killed only once.

To learn the extent of the birds' migratory journeys, and how long they live, we put on them tiny bands that serve as badges. By this means we may recognize the finch that last winter gathered the food from our bird table, and that meantime has raised a family in far-off Labrador. These birds, from being merely recognizable as being of a certain kind, have become personal friends. We have helped them to live, and they have helped us to live, and we both are benefited.

When winter is upon the land, and our visiting bird friends are hard beset, we put out food for them, and gain pleasure from their near presence, and the confidence that our bounty has quickened.

All these activities, that assist us to be interested in life, have to do with living birds. We are learning that, while a dead bird is gone forever, we may revisit with a live one, each time gaining a new message, and so we wish them long life. Who could kill the bird that he has once held in his hand, and that has come back to him after spanning half a continent?

Man's inventions, developed and used under the implacable urge of commercialism, have vastly increased his ability to kill, but we believe that a change of sentiment is coming to the fore. Other inventions have increased man's ability to appreciate his wild friends, and his use of these is increasing. Certain species whose flesh is palatable, and whose pursuit furnishes sport, are termed game birds, after ancient custom. They are treated as apart from others, and man seems willing to destroy them, and then replace them with aliens. But standards change; many birds commonly pursued long ago by the devotees of falconry are no longer objects of sport, and as we realize the havoc caused by the gun, successor of the falcon and the bow and arrow, reason dictates that we cease to use these things of beauty as targets. Their charm as living creatures has increased with their scarcity.

Some people, it is true, still bring birds to our shores from foreign lands, and after feeding and caring for them for a season, turn them loose to furnish sport for the gunner. Some will raise from the egg even our own bobwhites, and after a few months of domestication, betray the confiding creatures to their enemies. Let us not dwell on this subject, for to those who can do such things, the appeal of the living bird plainly has been in vain.

Ours was a land signally blessed with birds, blest probably beyond any land on earth. Yet we have so failed to heed the silent plea of these fairest of created things, that we have totally exterminated some, and have driven many others to the very brink of extinction. But as we rise from barbarism we are turning our ears more and more to catch the appeal of the living bird. Shall not its cause prevail, that our children may gather their rightful heritage—the opportunity to see, alive and in confiding familiarity, these creatures of beauty that we now harass.

MT. ROBSON CARIBOU

NATURE MAGAZINE

VOLUME 17 FEBRUARY · 1931 NUMBER 2

QUESTING FOR CARIBOU

CAMERA HUNTING IN JASPER NATIONAL PARK

BY ARTHUR NEWTON PACK

ILLUSTRATED BY THE AUTHOR

"How close do you have to get with that camera for a good picture of a caribou?" Charlie asked.

"Oh, seventy-five to a hundred feet," I replied.

Charlie looked disappointed and somewhat doubtful, but Major Fred Brewster had assigned him as our guide because of his reputation as a hunter, and he was not going to spoil our anticipations with any direct pessimism. "Well," he said, "if we have good luck with the wind and everything, mebbe we can do it. Caribou have awful sharp smellers. They can't see too well, but they shore can smell a man a long way off. Why, I've seen 'em start to cross my trail even after it was a day old and just as they hit it, up would go their heads and they'd go high-tailin' off as fast as their legs could carry 'em."

Our pack train was winding up the Portal Creek Trail in Jasper National Park, Alberta, and soon would come out on Maccarib Pass, named for the very animals we were hunting. Maccarib, Maccaribo, or Caribo is a name the Indians gave to our American reindeer. The Crees called him Ah-tik, but they referred mainly to the smaller animal found in such great bands in the great barren lands in the north. The mountain caribou we sought is to that creature as the elk is to the deer —larger, with great antlers such as no other deer of

CAMP OF THE CAMERA HUNTERS IN JASPER NATIONAL PARK

Base was made on the shore of lovely Amethyst Lake which nestled beneath a jagged ridge in this wild north country

similar weight can boast. Some zoologists give the caribou of the Jasper region a class all by himself. He is the Mt. Robson caribou, king of all the tribe, they say; but we need not be meticulous here. Size to a camera hunter is often but a matter of distance, and that we should soon know.

"Look, look! Three of them!" Abruptly the hoarse whisper came from Brownie as she rode ahead. Sure enough, there on the pass ahead, three great dark animals, somewhat like a moose in color and conformation, rose from the patch of snow where they had been lying, and trotted off in a peculiar, long-legged pace. They made for the barren slopes above the trail, and from the safe distance of three or four hundred yards stopped to survey our party. They were cows—at least no antlers were visible, although the caribou cow usually grows short horns. Their curiosity held them, and they trotted along a course parallel to ours for some time. Unfortunately, we had to keep on to make camp, and could not try any closer approach. Half an hour later we made out four more caribou crossing a snow bank in a small pass to our left. They saw us and kept on over the ridge until they were lost to view.

We made camp that night on the shore of Amethyst Lake, beneath that great ridge of jagged

"THERE SHOULD BE SOME OVER THAT WAY SOMEWHERE"

Art Pack, Doc Jepsen, Walt and Charlie look over the surrounding country for their caribou quarry

"AH, AH, THERE WE HAVE THEIR TRACKS"

Art Pack spots the caribou tracks—great wide-spreading half-moons. The animals' feet serve as snowshoes or aid as paddles in the water

"THERE THEY ARE OVER THAT RIDGE"

The watching camera hunters spot their subjects. The wind is in their favor and the big fellows are all unaware of the interest in them

"SO LET'S GET OVER THERE AND DO SOME TALL SHOOTING"

Hurrying across the snowbank and up the bank to get in position before the caribou get wise and before Walt and Charlie drive them down toward the waiting cameras

ramparts which mark the boundary between Alberta and British Columbia. All night long the intermittent roar of avalanches broke the stillness. Then, with the sun, we woke to the clatter of Harry preparing breakfast—a breakfast which the hungry gray jays tried to snatch almost from our very plates. Soon we were mounted, the cameras swaying in box panniers from a pack horse; and the little train of hunters filed slowly out of camp. The going was not of the best. Miles of soft, swampy muskeg surrounded the still lake. Horses sank to their hocks, struggled on; sank deeper, but kept steadily forward, with noses close to the ground. We kept on for two or three miles without seeing any animal life, except an occasional marmot, and then turned away from the water towards the mountains. Suddenly a pair of brown willow ptarmigan rose in front of our horses. One flew only a few rods and then walked about anxiously. We knew that there must be a nest of young within a few yards of us, but, although all hands turned in to search, we could find nothing. Meanwhile, Brownie set up her movie camera and photographed assiduously, getting quite close to the distraught bird. This was the father, we knew, for it is he—not the mother—who most boldly remains to protect the young ptarmigan. We waited perhaps half an hour, and then packed up the cameras and caught our horses. Suddenly, right from under old Grunt, the pack horse, fluttered the very birds we had sought so long. It was but the work of a frantic moment to capture four little ptarmigan peepers. Hardly more than three days out of the egg, the downy birdlings were persuaded to pose in the hand, in the camera case, and in every conceivable position.

"THERE'S A BIG BUCK"
He races off to parts unknown, trotting with a queer stiff-legged motion

"BOY, SOME SPEED"
The startled cow caribou gives an exhibition of real ability to cover ground

"THERE'S FOUR IN A BUNCH"
The whole family, perhaps, moving out to other less-inhabited parts

So much luck within the first few hours seemed enough for one day, but we angled up on the slope, picking our way through the tangle of windfall spruces and firs, and came out above timber-line. As we had hoped, there was

an upper basin here, concealed from below. Here we uncinched our saddles while Walter, our other guide, set out on foot to prospect from a knoll which overlooked the basin. The rest of us drowsily watched his small figure crawling over a patch of glistening snow. We rose and stretched lazily. A moment later we were galvanized into action. "Caribou! Caribou! Coming this way!" Out came cameras and tripods in a jiffy, but they were hardly ready before Walter appeared to report seven or eight other caribou still hidden from us by a ridge. Brownie and Walt, with one camera, hurried up the slope to the left, while Charlie and I hastened across the stream towards a knoll on the right, hoping that the animals would feed downwards between the two batteries. We were only halfway to our knoll when Charlie abruptly threw himself on his face. The first two caribou were coming out. Now grazing, now trotting briskly, they made straight for the spot where Brownie and Walt lay. Charlie crawled up the bank, hoping that they would get his wind and edge still farther over toward the second camera. The first animal stopped and sniffed and turned back. He circled and tried again. The man smell was in his nose. He paced forward, saw the camera and stopped. Brownie's machine buzzed. Then he made a dash and passed her. The second caribou tried to work between Charlie and Brownie, but he was almost concealed by the ridge, and the picture was spoiled. Then he looked over and saw us on the opposite bank. This time he did not hesitate, but set off on the back trail up the basin at a swinging pace, convinced at last of our identity.

A PAIR OF ANTLERS IN THE BLIND

They help make the hideout look a bit more innocent to the caribou

ONE OF THE JOYS OF THE MOUNTAIN PASS

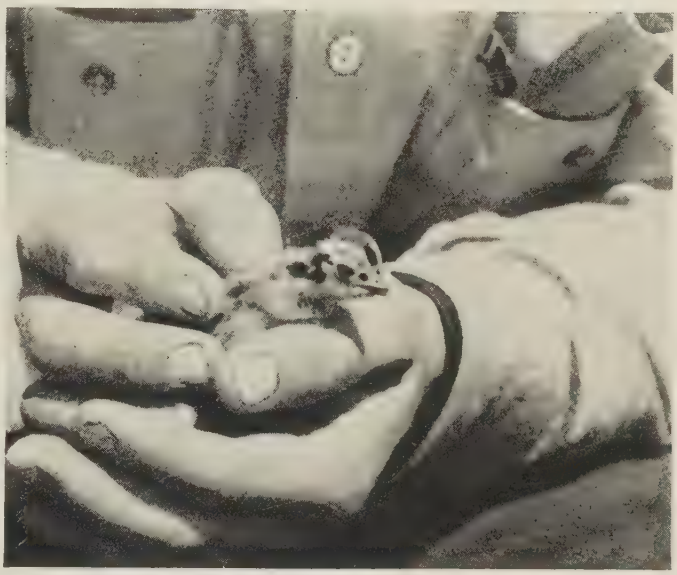
Melting snows have made the going soft and the horse sinks in deep

Presently the hunters met in the center of the draw and took council. There were more caribou in that basin. Charlie and Walter accordingly started up on either rim of the valley, while the camera operators again deployed. Again we were a little late. Two females with a calf were even then coming towards us from around a knoll. They saw us before we could fall flat in the grass. They, too, turned and fled back into the basin.

Walter and Charlie had disappeared. The sun shone upon the glistening peaks of the ramparts. The warm air made us drowsy. Across the valley I could just make out an occasional movement behind Brownie's camera, for there was no shelter of any sort to make a blind. The two caribou cows and the calf appeared far across the basin as tiny specks against a patch of snow. They were leaving the country by another pass. It seemed as if our luck for the day was over. Another half hour passed. Then I saw Charlie coming towards me. He waved his hat. I looked across towards the other camera, sat up, and grabbed my own machine. Six caribou appeared, almost simultaneously, from behind a rise of ground. They were close to Brownie. They came on. One was a huge antlered bull. I swung my camera into action, too, but again Brownie had all the luck. Nearer they came, and nearer. Her camera buzzed and buzzed, and she had to wind. Then, at the very instant when the quarry stood within seventy feet, the camera spring ran down. The animals swung around and started back, but towards them from the opposite direction, shouting and waving their hats, ran the two

guides. The bull snorted and seemed about to charge, but the two men were now fairly close together. The animals veered, slipped past Charlie, and paced off at a terrific rate. One cow remained. She tried in every direction to slip past the cordon of humans, without crossing the man tracks. The guides were in their element, breathless, but shouting in the zeal of the roundup. Now the creature came towards me, going like the wind. I speeded up my camera and kept it on her as she shot by, headed for some other country as fast as she could travel. Her long tongue hung far out of her mouth. She was tired, hot, and frightened. Even then, she only once broke into a gallop. Indeed, the long-legged pace seemed the faster gait.

Charlie and Walter threw themselves on the ground and panted with enthusiasm. Then we packed up the cameras and hiked back to the place where we had left the horses. Fortunately, they had not strayed far. Far below us the sunlight danced on the waters of Amethyst Lake, and two small spots at the timber edge far away indicated camp. Perhaps we could angle down the ridge and thus save time. The first twenty minutes were all right. Then we struck a rock slide and were forced downwards, more and more steeply. Brush and fallen logs barred the way. Loosely piled rocks, hidden by luxuriant moss, made the footing precarious. There was nothing to do but trust to our sure-footed horses, who, with ears cocked, noses smelling out the ground, crashed and slid down the mountain. For a wonder, even the camera horse got through without accident. I dreamed that night that a huge caribou chased Charlie across country until he was winded, whereupon the animal sat down on his haunches and boxed Charlie to a knockout.



BABY PTARMIGAN BORROWED FOR PICTURES
A brood was discovered with the father standing guard over them

Next morning we again rode out on the hunt. Our destination this time was another basin in the low ridge north of camp, but there was a long stretch of windfall timber to pass through, and pretty rough going. At last we came out in the grassy upper meadow and followed it to a sort of moraine, behind which the basin lay. Leaving our horses, we crossed a snow bank and scouted out the land on foot. There were recent caribou tracks everywhere, but not a sign of a living animal, except the ever present ground squirrels. We photographed some huge caribou tracks in the snow—great wide-spreading half-moons made by the best of snowshoes. The caribou's foot is truly a combination of snowshoe and skate, for the rubber-like pads yield, when necessary, to harder horn. More than that, however, those adaptable feet can become paddles for swimming, better than those possessed by any deer.

WHERE THE WILLOW PTARMIGAN NESTED
Finding the nest took some hunting but it turned out to be right under the pack-horse

Just ahead of us lay a pass—the same one on which we had seen four caribou against the snow when we were trailing in. We climbed the short distance necessary and looked over. Not a caribou was in sight. Only after we were mounted and on the way down the steep shale on the north side did Charlie sight a big bull grazing in a little pocket which had been hidden from sight before. Quickly, we slid off and led the horses back out of sight. The bull was out of camera range, but, although he had seen us, the wind was in our favor, and he did not take alarm. Caribou rely more

on their noses than on their eyesight. We set up the cameras and lay behind the two tripods, waiting. After a while, our quarry sauntered over to a snow bank and lay down, facing away from us. Again we waited, but he seemed bent on spending the rest of his life in his snowy bed. Eventually, Charlie and I decided to take the lighter camera and stalk him. Down the steep shaly slope we slipped and slid, keeping out of sight. We were afraid to circle too far below him, lest the noise of climbing up the loose shale disturb him too much. I peeped over a ridge. He must have heard us, for he was up and moving. I could not tell which way. Time was precious now. If he moved up, Brownie would get him. We must prevent his going down. We ran breathlessly in a long downward angle. He could not see us now. Ahead lay a stream. We leaped across. Up the other side—cautiously now. "Quiet as you can," whispered Charlie. I grasped the camera and crawled ahead. "Down, down! Get down!" came the hoarse whisper. I fell on my stomach. Over the ridge a few yards away a pair of tall antlers swayed upwards. Head, shoulders, body. The bull stood facing us. He snorted twice. My camera buzzed, and I dropped to my stomach to get a better support for the machine. Now the low shale ridge cut off his feet. I must get closer. Now the picture was right. Again the film buzzed. Then he was gone. "He went down," Charlie whispered. "Quick! Slide over to the next ridge, and he'll come out somewhere there below." We scrambled, threw ourselves on our faces, and held the camera ready. Not a hundred feet away, out walked the caribou. Golly, but he was a big one! He saw us again and snorted, seeming about to charge in our direction. Still, he was relying only on eyesight, for, although we could now notice that distinctive caribou scent, he could not smell us. For perhaps half a minute he paused, undecided, then turned and trotted down the slide. We saw him presently break into a pace. He had our wind now and knew what we were. A moment more and he was far below among the timber.

Only now that the caribou was gone did we realize how winded we were from the wild dash. I remembered passing two huge marmots within a few yards and with difficulty resisting the temptation to photograph them. Then we were breathlessly chasing bigger game, but now we might go back and look for them. They were gone. We looked upwards, where—silhouetted against the skyline—came Walter and the others with the horses. Thank heaven, we should not have to climb back on foot.

We spent the next morning in and around camp, in order to give our saddle horses a rest. A young man came from the Park Warden's cabin to look us over. The former warden had been killed by a grizzly bear a few months before, right behind his cabin. Our guide carried a rifle, in case we should get any undesired callers, but we hoped to get some pictures first. Brownie went off a few hundred yards to take pictures of marmots. I borrowed a cup, knife, fork, and spoon from our cook and placed them on a plate, with some bread and butter for bait. Then I set the plate on a stump and waited for the Canada jays. In due time they came and sat on the plate and ate, making a splendid series of subjects.

While one of the regular Nature Magazine parties was in Jasper National Park last summer, Mr. Arthur Newton Pack, President of the American Nature Association, was ranging the Tonquin Valley armed with cameras. As usual he brought back the results. This is the first of two articles in the setting of Jasper, to which another group of Nature Magazine Vagabonds of the Trail will travel during the coming summer. Plans for the new year are announced in the 1931 edition of "On Western Trails."

After lunch—our first not on the trail—we rode out again after caribou. We did not take a pack horse this time, as we were afraid he would fall into the treacherous muskeg, but carried one movie camera, a tripod, and the still camera on our saddle horns. We rode down the valley to the west toward Mt. Geikie. Our luck held. We had not gone half an hour before Charlie's sharp eyes sighted two caribou up above timber-line to the southwest, and we went up after them. We made our way through the spruce and fir almost to the edge of the upper meadow, and then left the horses while we scouted on foot. Walter crawled ahead. Presently, he crept back to us to report a huge old bull lying in a snow patch a few hundred yards to our right, while over the ridge straight ahead he had seen a cow and calf. Stealthily creeping on hands and knees, we edged closer to the little snowy hollow where the bull lay. Hatless, breathless, we stole along. Yes, there was the bull. We could just see his outline through the low firs. Closer now. Only a hundred yards lay between us and him, but we dared not risk the next bit of open. Unfortunately, he stood just behind those bushes. If he would only move just a few feet in our direction, he would be in the clear, and it would be a perfect picture. Our movie camera was mounted on a low tripod in full readiness, but we could not use it. We waited. The caribou still stood in exactly the same spot where we had first seen him. If he moved to the left, he would be in an even worse position for a picture. Charlie and I sneaked on all fours to another spot.

(Cont. on page 129)

THE WOODTURNER'S PRODUCT?
No, just the stem of the shave-grass, microphotographed

THE PLANT AS ARTIST AND ARCHITECT

BY HERMAN GEORGE SCHEFFAUER

Few plant studies have been as interesting as those pursued by Dr. Blossfeldt in his Berlin, Germany, studio. We present his exquisite results with gratefulness for his addition to the realm of the beautiful

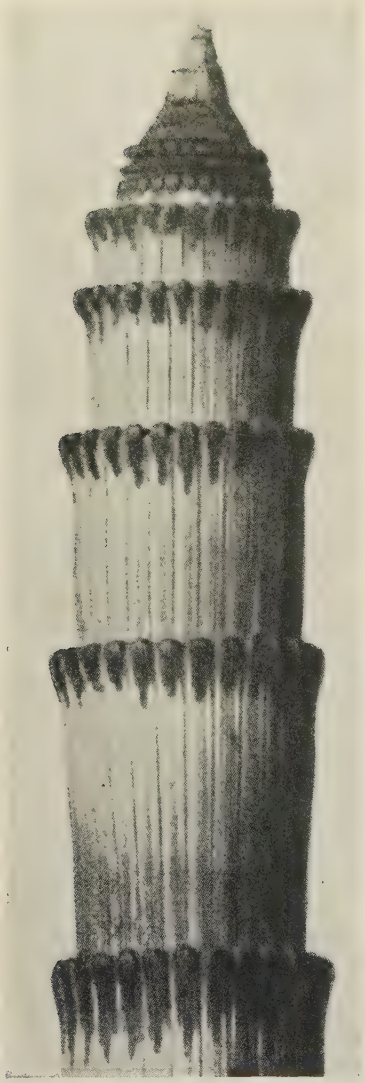
TOTEM POLE
Nature made this from a budding ash sprig

LIKE THE CREATION OF SOME MASTER WORKMAN
This graceful chalice, the fruit of the lowly henbane, might adorn any lord's table

THE microscope, held in the hands of scientists such as Pasteur, Moseley, and Langmuir, has long been an instrument of search for Truth. Only occasionally has it been held in the hands of the artist, who can translate for the world the Beauty it reveals. The great biologist, Ernst Haeckel, with the soul of an artist and poet, was forced by the wonder he saw through his lenses to lay down his instruments to give the world his *Art-forms of Nature;* but not until a quiet German sculptor startled his friends with his revelations did the full significance of the loveliness of the minute cosmos appear.

The sculptor was Professor C. Blossfeldt. He was one of the first to enter the new field of natural-aesthetic exploration, and he turned to the plants—not the exotic ones, but the common and unregarded flowers of the northern European Zone—to explore for Beauty with the eye of the painter, the photographer and the worker in plastics. And he discovered with his microphotographs that even in lowly weeds there is a visible idea of a plan, of a complicated, intricate, harmonious design which reveals these denizens of the field and meadow as architects who have builded well.

Nothing seems regular or formal about a hillside of flowers, but the keen eye of Professor Blossfeldt's camera has shown that in the building of a plant there are regularity of form, repetition and an

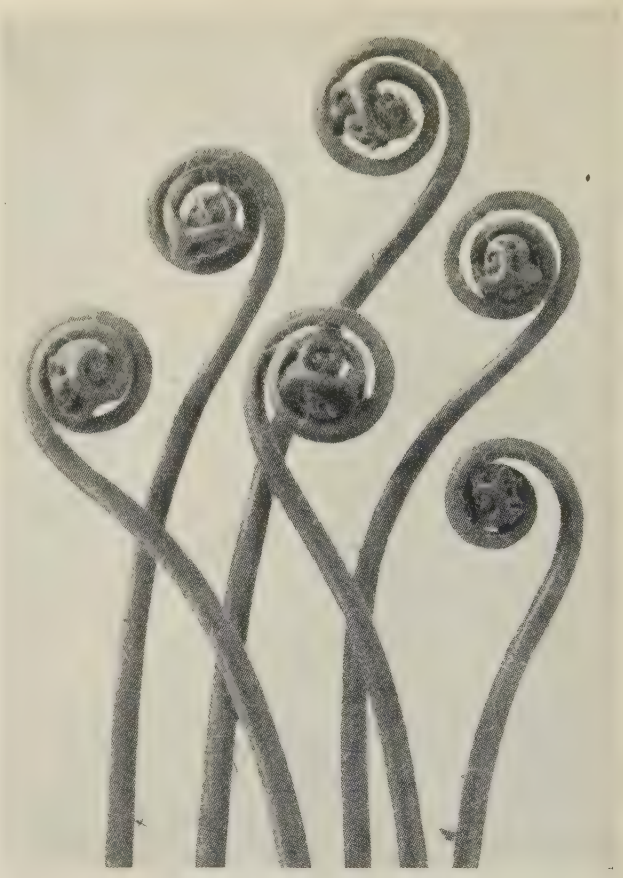


WHERE GREATER BEAUTY?
Man's architecture does not surpass this tower, created from an enlarged Equisetum stem

almost conscious tendency toward symmetrical, conventionalized beauty which has seemed to be the very opposite of the wildness of the vegetable world. There are new miracles of grace and loveliness, of restrained power, of budding forces, of mathematical and geometrical arrangement, of prototypes of architecture we had hitherto assumed to be purely the fruit of some master builder's fancy. For thousands of years they flourished and died, unheralded, until the microscope in the hands of an artist revealed them.

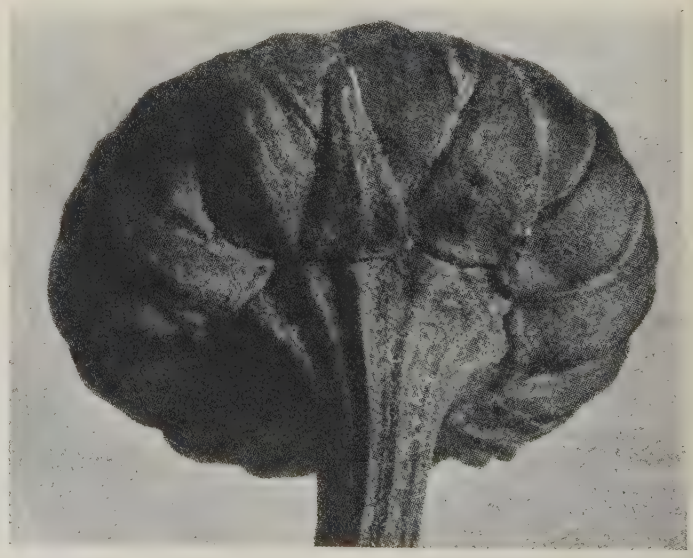
Dr. Blossfeldt brought to this pioneer work a great love of Nature, and Art that grows out of Nature, the eye and instinct of the artist, the sense of the plastic form peculiar to the trained sculptor, and the technical auxiliaries of modern times. He realized from the first that the world he sought to capture was a moving, constantly changing universe, and that he must discover not only the peculiar architectonic aspect of the plant, but capture it on his plate at the exact instant at which its bursting bud or sprouting shoot or unfolding flower reached its characteristic stage or phase of development. And so he had to make a biological adjustment to the habits and impulses of the plant—gain insight into its will, so to speak, into the laws that it obeyed by tiny movement and an inevitable urge.

Man expresses his aesthetic soul in different mediums external to himself—in clay, steel, concrete, or on canvas; but the individuals in the vegetable world make of themselves objects of art. There are, for example, the delicate bishop's croziers thrust up in exquisite carved volutes by the tendrils of a common field fern. Magnified but five times, they appear like the handiwork of some skilled craftsman. And in the round, hollow stalk



LIKE DELICATE BISHOP'S CROZIERS
The tendrils of a common field fern unwind in graceful volutes

of the horsetail or scouring rush is seen the archtype of Oriental architecture—domes and minarets, structures like the famous fluted Mosque at Delhi. This plant, which was working out its "green architecture" millions of years before Christopher Wren, has a marvellous symmetry within—like delicate gear-work are the series of cells or cylinders arranged in perfect divisions of a circle



AN INTRICATE PATTERN CAREFULLY DESIGNED
Nature has designed this chrysanthemum bud almost as if conscious of the architectural principles men have worked out

that a cross-section cut displays.

Nature has set the worker in metals a difficult task if he hopes to reproduce the fairy-like volutes of the compass-plant, whose very texture, as revealed by the photographs, seem to imitate the long-drawn form of iron or gold, and whose leaves crinkle stubbornly and with a certain stiffness as though bent by force. And Nature has mimicked that intimate child of Nature, the savage, by reproducing one of his totem poles on the end and tips of sprouting ash-tree twigs. Another of her most beautiful creations has been the slender, Gothic-like lines and upward tendency of the shoot of the unfolding snowball plant. The folded leaf of the water hemlock plant, looking like a strange insect or larva; the sturdy, proud, swan-like neck and head of the young leaf of the Christmas rose, the heavy, ruffled stem and scaly cusp of the chrysanthemum, and the dainty, vase-like fruit of the henbane, each present a new phase of the architecture of plants.

There is still another phase Dr. Blossfeldt has caught with his new visions of the plant world —the soul or animal aspect. Some of the plants in his collection seem to be capable of expressing what we would translate in terms of human emotion, particularly the bursting bud of the lily. The flower seems to rise exultantly toward the light, to stretch out its arms and expand its fingers to embrace the sun. The tension is clear in the vigorous limbs, teeming with sap; the bud seems, in fact, to dance—the entire movement is rhythmic. No painter, sculptor or architect could have devised anything so beautiful, inevitable, so full of abounding life and the sheer joy of existence as this.

THE AWAKENING OF THE LILY BUD

Its bud slowly opening, its whole stem lifting exultingly toward the sun, the lily does its dance of life

Plants are speaking a new language to mankind today—they speak with the tongue of beauty. The scientist, the botanist, the gardener and flower-lover hear them. The child that has only the streets for a playground and the subterranean workers who seldom see sunshine are both lulled into peacefulness by their soothing message. The artist, designer and architect listen to their overtones. Dr. Blossfeldt has done much to carry their message of loveliness to the people whose gaze is restricted to the world visible to the naked eye; and his collection of photographs, when exhibited in Europe and America, furnished adequate proof that Nature, even in Art, is greater than man and beauty lies concealed in everything.

THE REED WARBLER AT HER CRADLE-LIKE NEST

Deep in the reeds had she placed her home. This photograph was accepted and hung at the 1924 Exhibition of the Royal Photographic Society of Great Britain

Among the many inquiries that have come in about the American Nature Association trips particularly, and travel generally, there have been a number asking about European trips designed to place special emphasis on the Nature interest. Some such trips, personally led by one acquainted with wild life abroad, might be devised if the interest warranted. Would you be interested in a six weeks, all-expense trip, New York to New York, covering the most fascinating country in England and costing between four and five hundred dollars? All we desire is an expression of opinion, which, of course, implies no obligation at all

BIRDS OF THE DORSET COUNTRY

BY R. P. GAIT

PHOTOGRAPHS BY THE AUTHOR

On the eastern confines of that picturesque but little known English county of Dorsetshire lies the Isle of Purbeck.

The district is not an island but a peninsula bounded on one side by Poole Harbour, the tidal waters of which have eaten away the coast into innumerable muddy creeks, full only at high tide. A part of Purbeck is well off the beaten track—a land of big sandy heaths covered with gorse, broom and heather and dotted with pine trees whilst almost all the hollows are marshy and wet except during the hottest of weather.

Very few roads traverse this district and most of these are impassable to any thing but country carts from the lonely farms. Although offering few attractions to the tourist or motorist, the place is a splendid bird territory for the ornithologist, affording as it does to many of the rarer varieties of birds the peace of seclusion that they require during the breeding season. The main object of our visit, however, was not a rare bird, but the blackheaded gull, as we understood that there were several gulleries to be found in the vicinity. Armed with data supplied by a Dorset naturalist we set off per motor cycle for a fortnight's trip and by the time our kit, hiding tents, tent poles, camera, tripods, etc., were affixed to our backs and all the available projections of the cycles, we looked more like a couple of travelling showmen than anything else. Arriving at our destination we were lucky enough to put up at an old-fashioned thatched farm house situated on the banks of a creek. Space will not permit to tell of the memorable ride to reach that deserted spot, but it included riding through loose sand, down grassy slopes slippery with dew and over foot-wide planks across

THE RINGED PLOVER RETURNS
With many a side-track run and halt, she finally reached her eggs, whose marvellous resemblance to the surroundings protects them

"COME BACK! THERE'S NO DANGER!"
The male blackheaded gull did his best to reassure the female, and alternately cajoled and bullied her until she brooded again

ON THE DEAD RUN FOR HOME . . . .
Mother redshank decided the photographers had kept her off the eggs too long. The bower containing the eggs is at the extreme right

twisting, rushing streams.

On following up our directions we found that at place after place where thriving gulleries had once existed, there was not a nest to be found. We spent day after day on this search until a whole precious week had been wasted without a single plate being exposed. Finally we borrowed a leaky flat-bottomed boat and explored the mouth of the creeks. Here our quest was at an end, for the gulls were found nesting in large patches of weeds growing thickly in the salt mud.

The first place that we investigated was too wet, but later a keeper showed us a colony where the mud was firmer. Then commenced one of the most laborious tasks that has fallen to our lot with regard to bird photography. To judge from the birds there were evidently a number of nests in the weeds about two hundred yards from firm land, but to reach them was easier said than done, as the mud was cut up by numerous tunnels which meandered in all directions and which were full of water; in addition, the nests could not be seen until one was right on them. Under a broiling sun, with every footstep sinking deep in the sticky

. . . . WHERE SHE FINDS ALL IS WELL
She furtively eyes the photographers, who had cut down the grass in front of her to disclose her brooding activities

mud, we at last discovered a suitable nest for photography. Then we found that the mud afforded no support for the tent poles, so we had to return for four six-foot stakes which were pushed about five feet into the mud, the tent poles being lashed to the projecting ends. Our trials were not yet over when the tent was finally erected (in a high wind too!) as we had to once again return to dry land and find boards with which to make a firm floor for the shelter. When all was finished we breathed a sigh of relief and walked away to give our subject plenty of time to get used to the tent and also incidentally to obtain the wherewithal to slake a couple of first-class thirsts.

The blackheaded gull has become almost an inland species in Great Britain and is rarely seen out at sea; river estuaries, coastal reservoirs, lakes and the ploughed fields are their usual habitats. During the spring and summer the head is covered with a curious coffee-colored cap, a hood which, together with the blood-red bill and legs and the soft gray back and wings, gives the bird a very sprightly and tern-like appearance.

The next day my partner packed me into the tent and walked away, a procedure which adds fifty per cent to one's chances of successful photography. The hen bird took some time to get used to the eye-like appearance of my lens

A PERFECT THREE-POINT LANDING

The female blackheaded gull, growing accustomed to the glassy camera eye, allows herself to be photographed in many poses

A DIFFICULT SUBJECT CAPTURED AT LAST

The snipe was so quiet and matched the surroundings so perfectly that only steady watching made possible this pose

and made several swoops to the edge of the nest, one or two of which I secured at high speed on an open stop. The cock bird then came flying up and alternately bullied and cajoled his nervous mate into returning to her eggs, giving me the opportunity to secure an interesting study in expression, showing apprehension on the face of the female and confidence on that of the male. After some time we became very good friends and she allowed me to take photographs of her in all kinds of positions. Having finished with the gulls we were able to turn our attention to some of the other birds, the first being a pair of dapper little ringed plovers which we had seen several times on our sandy foreshore opposite the gulls' nest. After a watch from a concealed hiding place the female was observed to leave the mud, and with many a halt and many a side-track run, she made for a spot above high water mark. Here she settled down and through the binoculars the extension of her breast feathers over the eggs was distinctly seen and the new subject was soon found, though the eggs were not discovered at once owing to their marvellous resemblance to the surroundings. A few oystercatchers with an occasional sandpiper were also to be seen along the shore, but by far the commonest wader was the redshank, whose noisy shrieks followed us everywhere

when we approached their young ones, by now all hatched and hidden in the grass. The marshy hollows were full of breeding snipe, one of the shyest birds for photographic purposes, even after one has found its carefully hidden nest. Here again we had an uncomfortable job as the only nest that we found was in a tussock of long grass surrounded by water. Inside the tent there was only one dry spot and that was another tussock. If one should slip off that, one's feet descended into about a foot of stagnant water, while the atmosphere after the tent had stood for a few days in the sun made one long for a bathing suit. The snipe was so quiet in her movements and harmonized so well with the surroundings that a sharp lookout had to be kept or the bird would slip through the grass at the back of the nest and settle down on the eggs with her head and back buried in the herbage before her approach was realized. Near the snipe's nest was the home of a pair of reed buntings and not far off a red-legged partridge was sitting on a large clutch of eggs, while in the reed beds a number of reed warblers had carefully slung their cradle-like nests to the reed stalks.

These are some of the birds of this Dorset bird territory, but by no means all of them. The shortness of our visit and the numerous hours exhausted in hunting the gulls prevented us from following up many other interesting local species seen only from a distance.

A CHAMPION ELEPHANT EAR LEAF GROWN IN FLORIDA

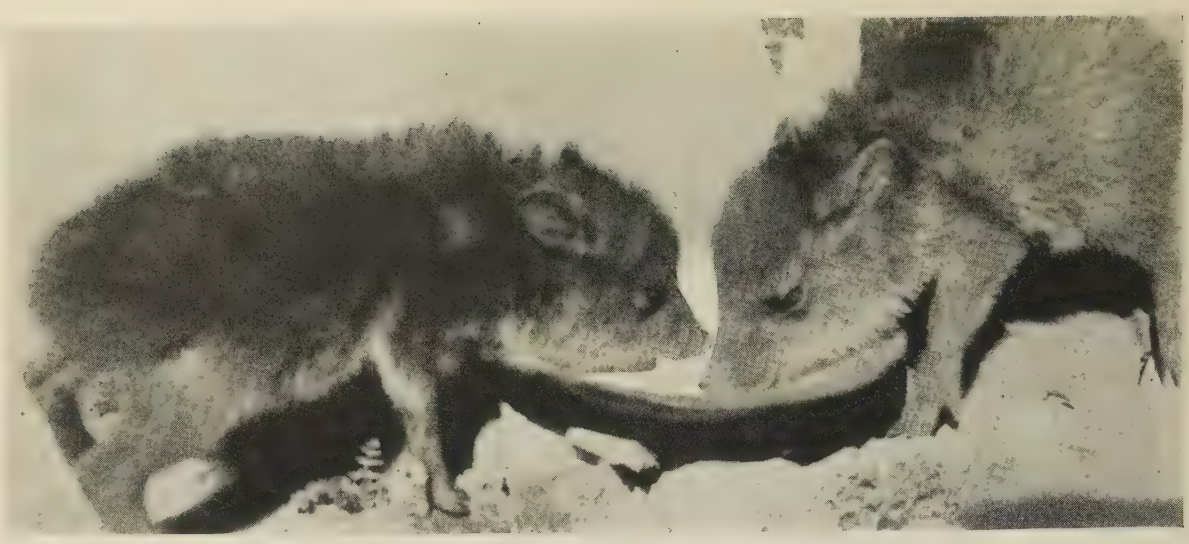
Measuring 45 by 62 inches, it surpasses the 1929 record leaf grown by A. B. Nolan, but was itself surpassed by a this year's product which seems to have brought the championship to Florida

THE BATTLE OF ELEPHANT EAR LEAVES

FLORIDA SURPASSES PENNSYLVANIA RECORD

THE elephant ear challenge flung to the world by A. B. Nolan, Carlisle Barracks, Pennsylvania, in January, 1930, Nature Magazine, has been vigorously answered by W. E. Sexton of Vero Beach, Florida, who claims to have so decisively defeated the Northerner that the elephant ear crown should be conveyed to the palm-shaded groves of the Peninsula State. Making light of Mr. Nolan's 1929 and 1930 champion leaves, Mr. Sexton points to bigger and better examples grown south of the Mason-Dixon line which dwarf the Pennsylvania entries. Mr. Nolan's biggest leaves measured 32½ by 47½ in 1929, and 37½ by 54½ this year, while the Floridian boasts of a last-year product, pictured above, with dimensions of 45 by 62 inches, and a 1930 monster precisely 54 by 68½ inches in size. No larger leaf has as yet been reported.

It is passing strange that the normally Democratic State of Florida should triumph over Republican Pennsylvania in the matter of elephant ears, and that the biggest ears should be grown in a year of Democratic victories. But politics aside, the elephant ear battle waxes merry, with probably new champions made in 1931.



PATTERING PECCARIES

TWO PETS OF THE DOORYARD IN ECUADOR

BY L. O. KELLOGG

IN contrast to the barnyard porker the peccary has longer, stiffer, and more numerous bristles, boasts a height almost equal to his wheelbase, and sports no tail at all, but he is the complete equal of his domestic cousin so far as appetite goes. The quest for food of these two little fellows was incessant throughout the day and even in the night they would wake at intervals and squeal for sustenance. On the chance of a possible handout they were forever pattering at the heels of some one of us. Luckily our Ecuadorean cook, who suffered the most from their pursuit, was at heart good natured, though quick tempered, and unusually fond of animals. After sweeping them from her kitchen with the broom she never failed to make retribution with a generous plate of milk or whatever else might be handy. Nothing edible was ever refused.

Though the pair constantly quarreled, they were devoted to each other and quite inseparable night and day. When one of them died—and we suspect it was from overeating—the other was so noisily inconsolable that we finally had to present him to the cook who removed him to her little farm to grow up, as she said, into a "watchdog". Indeed for watchdog purposes peccaries were esteemed in Ecuador almost as highly as geese and perhaps with reason, for in their wild state they are anything but gentle and stories are numerous of hunters being treed by bands of them. Nevertheless our peccary did not grow up to be a watchdog; instead his very savory meat proved too much of a temptation and he graced the cook's table before reaching his majority. Which, after all, was in some measure but justice.

THE TOOTH-ACHE TREE

IT IS SUPPOSED TO RELIEVE PAINFUL JAWS

BY WILLIAM A. MURRILL

THIS little southern tree, found from Virginia to Florida and westward to Arkansas and Texas, has light-gray bark and large, triangular prickles with corky bases which are very conspicuous on its trunk and branches. The flowers and berries are small, but in dense clusters, and the leaves suggest those of the sumach.

The bark of this tree is much used in medicine under the name of Xanthoxylum or southern prickly ash, while the northern prickly ash supplies most of the prickly ash berries of the drug trade. In parts of Florida, where the southern species is abundant, I have often chewed the biting, aromatic twigs and bark, and can easily understand why it is supposed to cure toothache. The taste is so strong that one simply forgets all but the sting.

"WE HEARD THE THROATY COUGH OF THE PUMA"

MY JUNGLE STUDY

BY DALLAS LORE SHARP

ILLUSTRATED BY R. BRUCE HORSFALL

This is the second part of this delightful essay on Barro Colorado Island, Canal Zone. The first part appeared in the January issue

IT MUST have been ten o'clock last night when the ornithologist, passing my door, said softly, "There is *Nyctidromus* calling." I had been only half-conscious of the sound, turning a deaf ear to it, really, as only another of the medley of night cries that come to me without form or meaning. I had heard enough and seen enough that I couldn't understand for that day. But when the ornithologist said *Nyctidromus,* I instantly saw the goatsucker, a new bird to me, and hurried out to listen on the edge of the bluff to the whippoorwill-like call coming up far away from along the margin of the lake.

A night or two before, the same man had come in and said, "Do you want to see *Pulsatrix* hooting?" Of course I did. Every night that big "spectacled owl" had been disturbing the darkness with his un-owl-like, insistent, and most unmusical croak. We went down into the ravine, and, with a powerful flashlight, picked him out on the limb of a tall tree, the bright circle about him showing his bow, his puffed-out throat, even the winking of his slow eyelids as he uttered his single unlovely cry.

Or the snake-man, the herpetologist, would stop and say, "Get on your boots and go with me on a little flashlight hunt. *Hyla gabii* is calling." *Hyla gabii,* like the spectacled owl, was always calling at night. I had done my ticks for that day, had my bath, too, hung up my heavy boots, and had even said my prayers out of sheer gratitude for my slippers. But *Hyla gabii* was calling, and I couldn't hunt reptiles with an interesting snake-man like this every day—if only he would hunt by day! And anywhere except among the slippery boulders and fallen logs and sloshy puddles at the bottoms of the deepest, blackest of ravines! To think where that snake-man has been, and what he has laid his hands on in the slimy dark, gives me the megrims. And what he has just missed laying his hands on!

So I put aside my book—Belt, or Bates, or Roosevelt right in the middle of the River-of-Doubt—and get into my boots, instead of my safe, clean bed, and what an ouphe's hunt we have, by this Friar's lanthorn led!

We are armed with bare hands, small duck bags tucked under our belts, and long, searching spotlights; or the snake-man may wear a cyclops carbide bulls-eye strapped to the center of his forehead, so as to keep both hands free for action. *Hyla gabii* stops calling under this baleful gleam, and stares back at the coming ogre, his own unseeing eyes like twin rubies burning in a tray of velvet black. To right and left along the ferny, spectral walls, and up the twisted, cluttered bottom of the gorge, sweeps

THE WHITE AND BLACK-BANDED SNAKE-HAWK IS ANOTHER DISTRACTION

the light, then back so as to bore a tunnel for our feet, and spot and fix with bulging wonder every unblinking eyeball wide open at our approach.

Only you cannot think eyeballs at first of these jewels, nor see anything about you in daylight terms, so full of "fern-seed" seems the magic dark, so eery this bar of elfin light which blinds all eyes while begemming them, though clearing and hiding your own.

We have crept into some genie's cave, or found the jewel vault in King Solomon's mines, each scintillating gem a creature's living eye. Spiders' eyes, eyes of moths and beetles, and frogs the size of beetles, on the bushes and along the dripping, leafy walls; eyes of newts, efts, shrimp and crayfish in the gleaming pools, and lizards under the rocks; and now and then the eyes of snakes, basilisks, and of an enormous, warty toad. I almost tread upon a crouching ground bird, the little tinamou; and now my light burns into the big eyes of a rabbit, a frightened agouti; and once the carbide ray in the forehead of the snake-man kindled into a scattered nest of glowing coals—the eyes of a band of white-lipped peccaries, on their toes ready, but powerless, to charge.

Night-time in Jungleland has its little thrills by spotlight where *Hyla gabii* calls. The professional herpetologist can give a reason for the faith and the urge that is within him; nevertheless his calling and election still seems to me Quixotic and unconvincing, so utterly barehanded is it, and nocturnal, and liable to clammy rock and surprise. And I am told, though I have not verified the statement, that a very large proportion of herpetologists die of nervous disorders, and not from snake bites, as one might suppose. It can be said in its favor, however, that their profession is not one of the terribly overcrowded, while yet essential, along with entomology and sanitation, to all human progress in the tropics.

Barro Colorado Island weather is steadily wet or dry, and evenly, deliciously warm the year around, the temperature in the shade ranging between 69 and 79 degrees Fahrenheit. Night hardly differs from the day. The dry season begins about the middle of December and continues until the middle of April, when the northeast trade winds shift, clouds gather, and the modified rainforest covering the Island comes into its own.

One's outer man in entering the jungle is quickly and gratefully adjusted to these conditions, but inwardly I was conscious of a certain reluctance and drag, probably needing the stimulus and the greater variety and the sharper demarcations of weather that I was used to at home; unless (I hate to think of it) the lusty young jungle, marking the cane and stool I carried, whispered, "Senility!" to the monkeys so clearly that all the Island understood.

I arrived in February and found, quite naturally, the flush of spring upon a few of the budded trees; and upon still others the ripeness of the fall. It is always spring, always summer, always autumn here, and in spots, confined to a single tree-top usually, all the nakedness of winter. Here stands a tall guayacan, shortly to bud and flower, and close beside it a monkey-comb tree full of

ripe, brown, spiny pods that look like a cross between sand dollars and sea urchins. The green Amazon parrots are biting pie-shaped wedges out of the prickly pods and feeding on the nutlets within. A few paces on stands a smooth, green-barked bombax tree as naked as a telephone pole except for here and there at the tips of the twigs a yellowish-white pompon of a flower, all stamens, the size of your fist, and often a dangling pod, not unlike a cucumber for shape and size,—all four seasons here in a single tree!

The yearly calendar is simply wet and dry, but the days, instead of travelling in annual procession with the sun, chase each other like monkeys over the roof of the forest, and seasons seem to mate like birds and build nests in certain tree tops. The privilege of a tree's going naked for a time in the jungle appears to be by grudging appointment, as if it were a kind of sabbatic leave, though how such needs are known, and what the physiology of a sudden and complete loss of foliage for a non-deciduous tree is, I should like to know. Anyone can see, however, that if universal winter were proclaimed in a tropic forest, if all the trees let fall their leathery leaves together, unroofing the jungle, and the direct sun were to beat down upon the unprotected floor, the red clay, *barro colorado,* would bake and crack, the roots of the trees would shrivel, and the flesh of that forest would cook and crisp on its bones.

A leaf is an awesome thing on whatever bush it grows, the glazed rubbery, jungle leaf not less so for being, besides other things, the jungle's shield and buckler against the sun. In the rain-forest the old foliage is always falling, leaf at a time, an ordained time, each small rent in the vast, umbrageous, tangled roof, covered by a new leaf according to calculation and decree. There being neither great nor small in Nature, a leaf to stop a sun-leak in the roof of the jungle is as essential as any starry rafter in the sky.

Hardly any leaf-mould accumulates in the forest on Barro Colorado Island, so swift is the chemistry of fungus and insect. Few trees fall. They are eaten standing by the strangling figs or by the devouring termites, the space already overcrowded before they cease to leaf out and flower, their ashes, when they do crumble, only so many invisible salts and gases rebuilding into the tall boles that fight their way up to a place in the sun.

Let a single live tree be blown down, or a wide-topped one shed its leaves as our maples do in an autumn shower, and there is consternation in the suddenly opened space below, so little leaf-mould there is to hold the moisture against the sun. The shade-loving insects scurry to cover. The ground-building birds shy away. Even the ants and butterflies that dwell on, or close to, the forest floor depart. The small plant life withers, and soon you see the sun-loving grasses, the weeds, and other foreign growths starting, and with them a new order of insect and bird life appearing, life not adapted to the forest, and possibly destructive of the forest. That leper spot may be a hundred years in healing, if it is ever healed. It takes teamplay to keep the jungle whole.

"EVERY NIGHT THE BIG OWL HAD BEEN DISTURBING THE DARKNESS"

Catch as catch can, each for himself, in the jungle, and nowhere does the individual tree seem to fight more fiercely, against such a welter of foes. But yet, "the strength of the wolf is the pack", the whole jungle, behind the shelter of its overlapping roof, fighting for the life of its individual trees; the lianas binding trunk to trunk and branch to branch, taking also the brunt of the battle overhead, shock-troops of the forest against the barrage of the sun.

For every species of tree on Barro Colorado Island there seems to be two species of tree-climbing vines, and this proportion, seen from within by stem or leaf or flower, or from above as it shingles or shields the forest, is highly significant of the important, if not, indeed, the determining, rôle of the liana in the ecology of the tropical jungle. Just now, too, they should be leading the procession of the jungle flowers, for two or three species of lianas are in glorious bloom, but, except for the purple wreath and the red passion vine, their blooms are out of reach, and quite out of sight, unless one botanizes by airplane. From the cayuca, however, around the border of the jungle, from the observation tower on the highest point of the Island, and from my study windows looking down the steep, slant walls of the ravines, I see cascades of foamy white, dripping falls of pink and gold and lilac where the flowering lianas break out of the universal green, splash over the eaves, and disappear within the jungle shade. If I had the wings of the great white snake-hawk—I should hunt snakes as the snake-hawk does, of course, down in the tangled glooms, but first, I think, I should make a botanical trip over the roof of the Barro Colorado Island forest when the lianas are in bloom.

"A SINGLE SCARLET BLOSSOM OF THE PASSION VINE PENDANT IN A SPOT OF SUNSHINE"

That white and black-banded snake-hawk is another of the distractions of my study windows. A pair of them must have a nest in the ravine on my side of the laboratory, big, spectral, ghostly shapes pricked out against the deep shadows as they sit by the hour watching for a snake or basilisk or spotted lizard. Central American governments ought to protect and propagate this particular bird-of-prey, if such a thing were possible. Unless it is the peccary bands, we seem to have nothing on the Island which makes such consistent and successful warfare against the reptiles as this white hawk. Time and again I have seen him wheeling and screaming above the forest with some reptile writhing in his talons. Snakes fare ill in the tropics (and they deserve to), so ill that we are positively short of snakes in our laboratory jungle, it being something of an event to see one, and the cause of general excitement when a new live one is added to our scanty collection.

I had just returned from the trails yesterday when I heard Emesia calling with suppressed alarm. All I could make out was *"Culebra! Culebra!"*—*"Snake! Snake!"*—if snake it was. No matter what it was. Emesia was in trouble. I remembered how, upon my arrival at the laboratory, I had heard Miguel yell, *"Veepera! Veepera!"* in the early dusk one evening, a peculiar, chilling terror and importunity in the cry. So now with Emesia, and flinging myself through the door I found her half way down the ravine-side, hands on knees, bent nearly double, watching with a sort of fury a large, greenish yellow snake trying to wind up the smooth silvery trunk of a dead tree. The reptile had ascended some fifteen feet, and clung as if inlaid, flattened vertically to the bole, as fascinated by the girl as she was by the snake. She was not alarmed, except at the chance of the creature's getting away, so eager was she to deliver a new serpent into our hands.

I had to hurry back for a long rake while she and one of the men kept the snake in place. Fixing a slip-noose to the end of the rake-handle, and standing well up on the steep of the ravine, I soon had *Spilotes bullatus* dangling over an open bag, much to Emesia's relief. It was not a "rare bird", nor was it of any particular interest, though none of us had seen it on Barro Colorado before, as Emesia had rightly suspected. But it was a snake, and in the tropics, a (Continued on page 125)

THE CAMERA CATCHES SOME FAMOUS INDOOR SUNBEAMS

COURTESY NEW YORK CENTRAL LINES

These are seen by the casual traveller passing through the Grand Central Railway Station in New York City

LIGHTS AND SHADOWS IN THE AIR

SOME FACTS AND IDLE TALES CONCERNING THEM

BY CHARLES FITZHUGH TALMAN

RUSKIN is not always a safe guide in matters scientific, but in his "Modern Painters" he gives an instructive account of the beams and shadows that we often see radiating from the direction of the sun when that luminary is partially screened by clouds or other objects. This appearance depends upon the presence in the air of a certain amount of mist or haze, the particles of which scatter and reflect the light falling upon them.

As, however, the same scattering occurs when the sun shines in a clear sky, the effect of the obstructions is, as Ruskin points out, merely to produce shadows. The sunbeams are incidental. "What," he says, "we usually think of as beams of greater brightness than the rest of the sky are, in reality, only a part of the sky in its natural state of illumination, cut off and rendered brilliant by the shadows from the clouds. These shadows are the source of the appearance of beams." And he is perfectly correct.

Another fact on which this writer dwells is that these beams, due to the presence of real shadows in the air, are totally distinct from the slender rays that seem to proceed directly from the solar disk on account of its dazzling effect on our eyes, and that we also see extending from stars and other luminous sources. In one case the phenomenon is physical, in the other physiological.

Ruskin raises the interesting question whether it is legitimate for the landscape painter to depict these purely subjective rays, which are almost universally shown in symbolical and conventionalized representations of the sun.

"It is very certain," he says, "that we never look toward a bright sun without seeing glancing rays issue from it; but it is equally certain that those rays are no more real existences than the red and blue circles which we see after having been so dazzled, and that if we are to

represent the rays we ought also to cover our sky with pink and blue circles. I should on the whole consider it utterly false in principle to represent the visionary beam, and that we ought only to show that which has actual existence."

The real beams—or, if you please, the beams outlined by real shadows—are known to science as "crepuscular rays." They and the shadows between them appear to fan out from the sun as a center, but they are really parallel, since the light causing them comes from a source millions of miles away, and their divergence is a mere effect of perspective. Crepuscular rays are seen not only when the sun is in the sky but also when it is a little below the horizon, before sunrise and after sunset. In such cases the radiating shadows may be due either to clouds or to distant hills and mountains. Rarely one may see what are called "anticrepuscular rays." These seem to diverge from a point diametrically opposite the sun and are merely the prolongation of the ordinary rays, which may or may not be visible at the same time. On very rare occasions the rays are seen to extend entirely across the sky.

Phenomena of this category are too striking not to have found a prominent place in folklore and mythology. One of the commonest sayings about the beams when they are seen extending downward from the sun's position among the clouds is that "the sun is drawing water." This expression implies the belief that the beams are visible streams of moisture sucked up from the earth, but they really have no upward movement, and while the haze that makes them visible sometimes consists of water droplets it is often composed of dust. Some of the finest examples of crepuscular rays are found in the dry and dusty air of deserts.

A FAMOUS TOWER CASTS ITS SHADOW PH. WEHRLE

The Paris fog catches up the ghostly outline of the Eiffel Tower

In popular weather lore the appearance of "the sun drawing water" is most widely regarded as a sign of rain, though just the opposite belief also prevails to some extent. Neither notion is sufficiently well-founded to be of practical value in weather forecasting. An English-speaking sailor (if he knows what is expected of him by the authorities on nautical folklore) will tell you to look out for a storm when the sun gets up his "backstays," and there is a French nautical proverb to a somewhat similar effect:

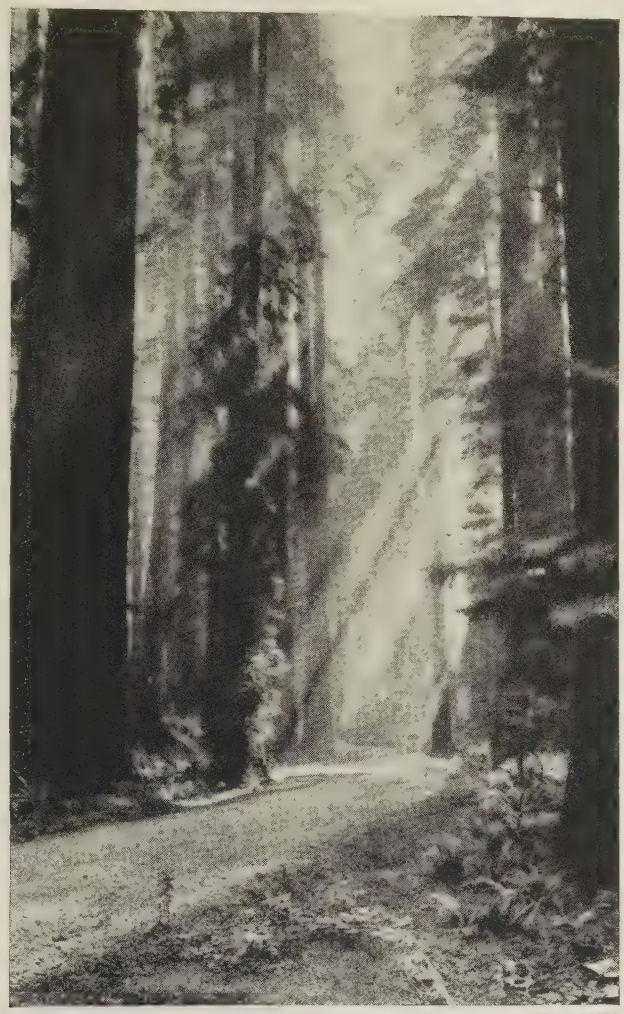
"Soleil avec haubans,
Pluie et vent."

THE SHADOW OF MOUNT HOOD AT SUNSET C. WEISTER

An example of fine photography that illustrates an interesting phenomenon

Crepuscular rays spreading fanwise above the eastern horizon before sunrise explain Homer's description of the "rosy-fingered dawn." Beams stretching downward from the sun have been called "Buddha's rays," "Jacob's ladder," "waterpipes," and other things. In Polynesian folklore the beams below the sun are said to be "the ropes of Maui"; whereby hangs the following tale, related in Ralph Abercromby's "Seas and Skies in Many Latitudes":

Long ago the sun god, Ra, was not so regular in his habits as he is today. In fact, he rose and set whenever he pleased, with-



SUNBEAMS AMONG THE SEQUOIAS A. H. PALMER
Where fog catches the light sifting through the foliage

out the least regard for the convenience of mankind. It was hard for mortals to adjust their occupations to the capricious behavior of a sun that would sometimes set in the middle of the day and sometimes rise at midnight.

At last the great hero Maui resolved to make him mend his ways. The first step was to capture the erratic deity, and in order to do this Maui set six snares of coconut fibre along his daily path. When Ra next started to cross the sky the first noose encircled him, but slipped down and only caught his feet. The second slipped, too, but caught the sun god's knees, while the third caught him about the hips. Still Ra pressed on. The fourth noose tightened around his waist, the fifth under his arms, and finally the sixth noose caught him around the neck and nearly strangled him. Only then did the sun god confess himself conquered, and he begged for his life, promising that, in the future, he would observe regular hours. Maui let him go, but wisely refused to remove the ropes, as he wished to keep him in fear. To this day the ropes can be seen dangling from the sun to prove the truth of the story! Scientific evidence!

Crepuscular rays assume their most beautiful aspect when they appear in the rosy light of the eastern sky before sunrise or of the western after sunset, the pink shafts of the sunbeams alternating with shafts of deep blue or bluish green. At Tucson, Arizona, where systematic observations of these displays have been made by Prof. A. E. Douglass, as many as twenty-two pink rays, separated by a corresponding number of blue shadows, have been counted at one time.

Akin to these appearances in the sky are the beams of sunlight that stream down through the foliage of a forest, especially when a light fog hangs in the air, and those that enter an otherwise unilluminated room through small windows, chinks in the shutters, or other small openings. The "gay motes that people the sunbeams" are mostly solid dust particles indoors and either dust or water drops outdoors, but at high levels of the atmosphere the ice crystals of a "cirrus haze" probably sometimes play the same rôle. Ice is doubtless also responsible for some of the striking crepuscular rays and kindred effects seen at all levels in the polar regions, including the so-called "earth shadows" cast upon the sky by Mount Erebus and other peaks in the Antarctic.

Mountain shadows are not uncommonly seen in the sky in other parts of the world. Dr. Vaughan Cornish describes those of the Wetterhorn, in the Alps, at sunrise:

"The projecting pinnacles of the mountain crest cast dusky shadows on the sky. These are much better displayed than the crepuscular rays from a cloud, which are obscured by the silver lining. As the sun, climbing behind the mountain, approaches the summit of the ridge near its middle point, the shadows flare out on either hand and each takes the form of a sharply pointed spike, the point not symmetrical but at

LOW SUN OVER THE PACIFIC OCEAN
Here we see crepuscular rays extending both upward and downward

THE SUN "DRAWING WATER"
A scene at sunset over the Golden Gate, San Francisco Bay

the extremity of the upper side of the shadow. The whole pattern is that of a stellate or spiked crown, such as is shown on the coins of the later Roman emperors."

In his guidebook to Mount Washington, N. H., Frank H. Burt says: "A wonderful feature of both sunset and sunrise is the projection of the shadow of the mountain itself upon the sky. At sunset it should be looked for from the Summit House platform a few minutes before the actual disappearance of the sun, and at sunrise just after the sun comes into view. So sharp and well defined is the shadow under favorable circumstances that it may easily be taken for a real mountain."

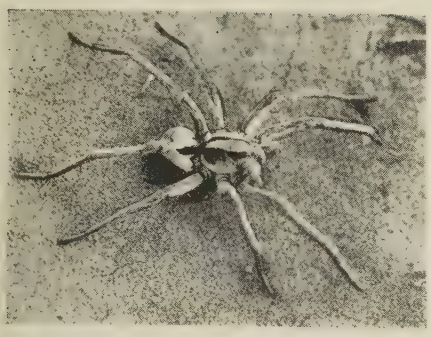
Several other mountains are more or less celebrated for the shadows they cast at sunrise and sunset, not only against the sky but also over adjacent lowlands and sometimes over the surface of a low-lying fog or mist. The Peak of Teneriffe sometimes casts a conspicuous shadow on the island below, while the shadow of Adam's Peak, in Ceylon, is probably the best known example of this phenomenon in the world. Abercromby paid a visit to Ceylon for the special purpose of viewing this shadow, which, at sunrise, is described as seeming to rise from the ground and stand up in front of the spectator in the form of a gigantic pyramid, and then either to disappear altogether or to fall down suddenly to the earth. The apparent upstanding of the shadow, Abercromby says, "was simply the effect of passing mist, which caught the darkness at a higher level than the earth." The shadows of Mont Blanc and Etna at sunrise are so remarkable that they are described at some length in guidebooks. The former is usually known as *le spectre du Mont Blanc.*

The Brocken spectre is a small-scale version of the mountain shadow, the object that casts the shadow being usually the observer himself, while the surface on which it falls is a nearby cloud or fogbank. The mountaineer sees such a shadow when the sun behind him is low in the heavens, but from aircraft one may look down upon it at midday when flying above the clouds. The phenomenon is, however, by no means confined to high levels, nor is it produced entirely by sunlight. It has been seen on a bank of fog at sea, and it is sometimes formed in foggy weather by artificial lights. The Belgian meteorologist Lancaster, looking one night out of his bedroom, saw his shadow cast by the lamplight upon fog outside.

A fully developed Brocken spectre is made more striking by a glory of colored rings—the so-called Brocken bow—surrounding the shadow of the observer's head, and occasionally the glory is surrounded by a much larger ring of white light—the fogbow, or Ulloa's circle.

The Brocken spectre, with its luminous appendages, has given rise to innumerable tales and legends. Some of these relate to the Brocken itself—the witch-haunted mountain in Germany where the spectre is frequently seen, though not more often than in hundreds of other localities throughout the world. In western China there is a mountain called Gin Din—the "Golden Summit"—where the shadow is identified with Buddha and the colored circle about its head is called "Buddha's glory." The place where it appears is at the edge of a mile-high cliff, and it is said that every year some of the pilgrims who climb the mountain to behold the shadowy figure attempt to throw themselves into its arms, and perish.

Preliminary announcement is made elsewhere in this issue about the American Nature Association's trail trips in the West. These are described more fully in the booklet, "On Western Trails." This booklet will be sent to all those who have inquired about them in the past and to all others who are interested. Just write to the Director of Field Trips, American Nature Association, Washington, D. C.



THE SLENDER MALE

He is lighter gray with a few darker markings while the female is notably stout of body and short of limb

THE STOUT FEMALE

At the left the old spider defends herself when removed from her burrow, with forelegs aloft, jaws spread

THE LIFE OF A BURROWING SPIDER

BY SHERMAN C. BISHOP

DEPT. OF BIOLOGY, UNIV. OF ROCHESTER

PHOTOGRAPHS, EXCEPT ONE, BY THE AUTHOR

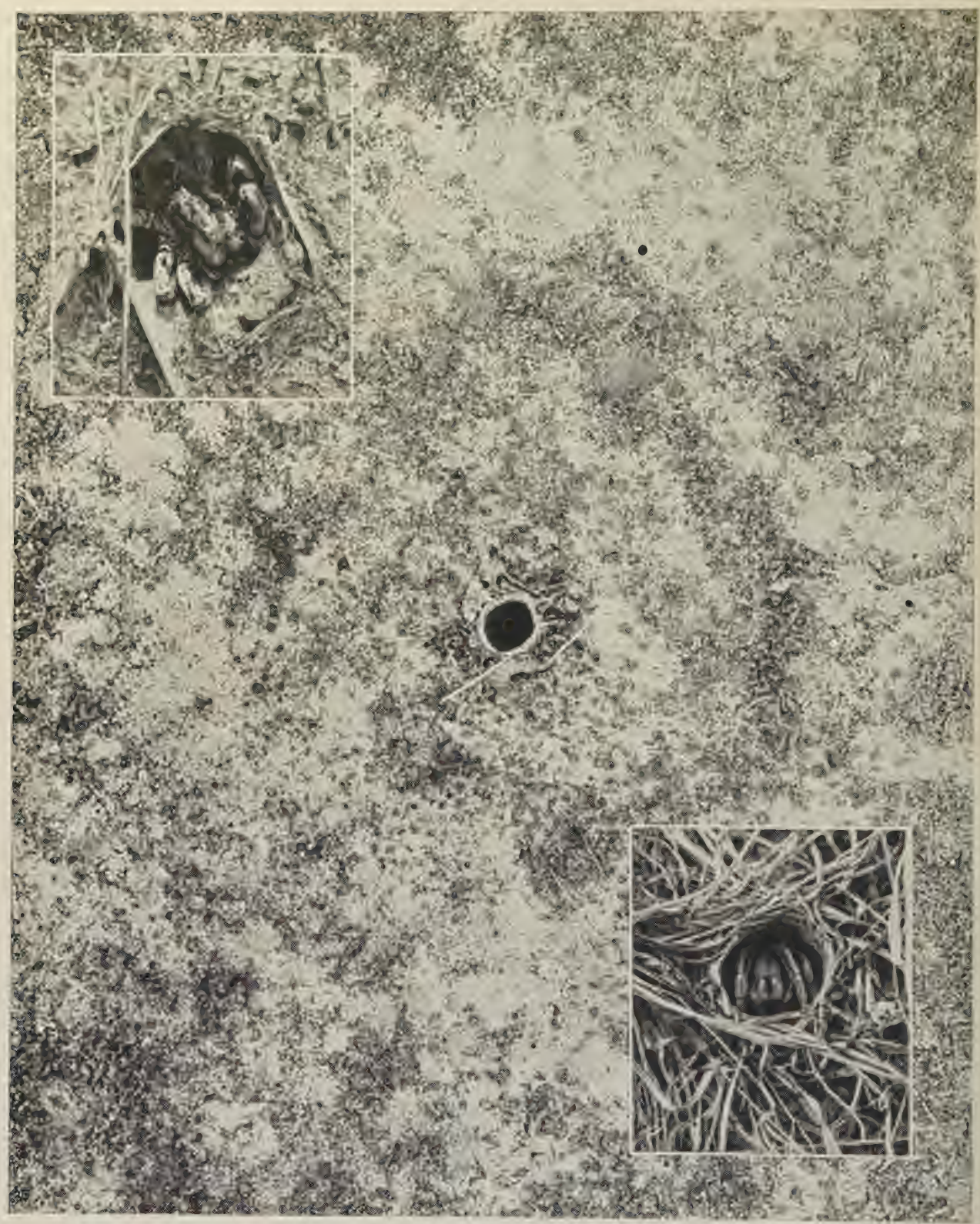
Few spiders have achieved the distinction of a common name. The favored ones are conspicuous because of their abundance, their size, web-building ability, brilliant markings, or some striking habit. Many families of spiders, however, have been provided with popular names which, in a measure at least, are descriptive of habits or structural peculiarities of the members composing them. Thus in the family Attidae are spiders whose short stout legs are eminently fitted for jumping and the name Jumping Spiders has been given to the group. The members of another family, the Argiopidae, are chiefly responsible for the marvelous orb-webs and have been called the Orb-weavers. The spiders of the family Lycosidae are hunters which secure their prey by the chase or by lying in ambush and are known as Wolf Spiders. To this group belongs the spider, *Lycosa nidifex,* whose life history is here briefly given.

Wolf spiders are common and may be found running over the ground, hiding beneath stones or living in little shafts or tunnels sunk straight down in the earth. Some of the tunnel builders construct a watch tower or turret around the mouth of the burrow and from this point of vantage watch for passing insects,—hence the name, "Turret Spiders".

There are two main divisions in the body of a spider, the cephalothorax which bears the appendages and eyes, and the abdomen which carries, among other things, the spinning organs, called spinnerets. The full grown turret spider reaches a length of about seven-eighths of an inch and is stout bodied and short of limb. The general ground color is reddish brown, mostly obscured by a covering of gray hairs. Along the midline of the cephalothorax there is a broad, light band. The abdomen is marked above with a dark central band which tapers to the spinnerets. The smaller and more slender male is light gray with darker markings bordering a central stripe on the cephalothorax. The abdomen is marked above with a dark central figure and on the sides near the front and on the under side are dark patches. The legs of the male are long and slender. In both sexes, the under surface of the four terminal joints of the first two pairs of legs is black.

In some sandy upland waste place given over to scrub pine and oak, to bur-grass, lupine and broom sedge a colony of turret spiders may become established. Here and there are small straight shafts sunk in the yielding soil and surmounted at the mouth with a raised rim, like the curb of an old-fashioned well. Other holes may be found nearby, perhaps, made by the solitary bee or the larva of a tiger beetle, the openings left unguarded. If the spider burrow is dug in places where there is scant vegetation, the turret may be low or missing except for a collar of silk to prevent dry sand from drifting in; if dug through turf, it often rises an inch above the surface and is tied together and lined with silk to make a substantial resting place.

When the warm sun of late March tempers the chill of the damp burrow, the turret spider stirs in her narrow cell, stretches her legs which have been curled beneath her all winter, and ventures up her shaft to daylight. After a week or two, or perhaps a month if the season is backward, the colony wakes to definite activity. Here and there fresh earth may be found near the mouth of a bur-



THE BURROW OF THE MOTHER, WITH THE BLACK SPOT HIGHER UP THAT OF THE YOUNG

When the ground is smooth and level, the earth from the burrow is spread about the opening in a broad circular band. In the upper inset is a burrow in a place of scant vegetation. The turret may then be low or missing except for a collar of silk. In the lower inset is a burrow partially roofed over

row, a battered turret is repaired or a shaft widened and given a new and delicate lining. The spiders are working diligently, straightening and deepening their burrows, carrying out the earth in little silk-tied pellets held in the jaws. If the ground is smooth and level, the pellets are scattered about the opening in a broad circular band, but when the entrance is on a sloping bank or against a tussock of grass, they are dropped in a heap on the lower side. In either case, they are soon flattened by the sun and rain and are inconspicuous unless the earth of which they are composed is of a color different from that of the surface soil. They may be frequently discovered, however

The turret that surmounts the opening of the burrow is constructed of the loose materials nearest at hand and may consist of bits of leaves, grass, small twigs or fragments of wood used indiscriminately, but carefully tied with silk. And here on bright days the owner mounts guard. Because the spider often chooses the sandy waste places for her burrow, the prey is often the brilliant tiger beetle or a ground beetle that strays too near. Even the burly June bug may be a victim. The hapless prey is pounced upon and dragged below for a subterranean banquet, and the bottom of the pit hides the remains.

Although these spiders live in colonies and often dig their burrows fairly close to one another, their proximity is due to the method of dispersal of the young rather than to any particular social instinct. Indeed, they accept one another as an article of diet as readily as they do an alien insect. The males, females and young, after leaving the mother, occupy separate burrows, maintain themselves independently and continue in a state of war with all comers.

If the spiders are collected early in the spring, none will be found mature, but in May they shed their skins, increase perceptibly in size and enlarge their burrows to accommodate the new dimensions. The largest spiders are now mature and their discarded skins are dropped in the burrows to mingle with the legs and wings and other inedible remains of insect victims.

Late in May the male goes courting. This is a hazardous venture at best because the female has twice his bulk and an appetite in proportion. If he is successful in finding the burrow of a female, he lays siege at the entrance, proceeding cautiously lest he is pounced upon before making known his intentions. If the female is at the burrow mouth, she will be found with her legs tucked beneath her, ready at all times to leap forth or drop back into her pit. As the male approaches,—stiff-legged, with short, jerky steps—the female becomes more alert, braces herself in the turret mouth and watches the advance. The male approaches slowly within an inch or two of the turret, his first pair of legs held straight up over head with the black undersurfaces toward the female. Now and again he stops and waves these slender banners up and down, sometimes together, sometimes alternately. He is excited and eager but still cautious. Every spine and bristle stands erect, his palpi tremble visibly. The female passively waits until he almost reaches the turret then lunges forward viciously. The male retreats precipitously, but he is soon back to begin again his slow advance. On his second trip, perhaps, he reaches the turret itself and touches it gently with the tips of his fore legs. If there is no response, he becomes bolder and taps it sharply. Another lunge of the female sends him scurrying away as before and the maneuvers are repeated and repeated until the female finally accepts his advances or repulses him altogether. If he is accepted they embrace and, perhaps, lured into a sense of false security, the male relaxes his vigilance for a moment and is promptly devoured. At the wedding banquet the male is present but not interested.

The tragic end of the male following the brief nuptials explains a number of things: the existence of empty, open burrows when many of those composing the colony are tenanted but closed, the absence of mature males during the summer and fall, and the presence of the inedible remains of the male at the bottom of the pit of the female.

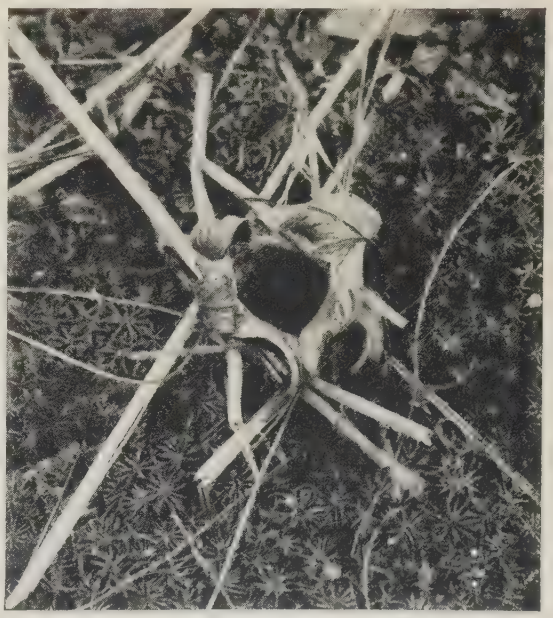
In June a change comes over the colony and it seems de-

WAITING FOR PASSING INSECTS

The old ogress at the mouth of burrow patiently alert

CLINGING TO HER EGG-SAC

Even when forcibly removed from her burrow the female will not desert it



THE HOME OF THE TURRET SPIDER

The turret is of loose materials fitted together with silk

serted. Here and there the open burrows of small spiders may be found and the abandoned pits of the old males but most of the rest have disappeared. The females have gone into retirement to spin their egg cocoons, razing their turrets just before, lest they betray the nest site, and closing the entrance with earth and silk against invasion. In the darkness of the burrow the eggs are laid and wrapped in a silken cocoon and in the darkness the mother takes up her burden and her long vigil. Unless the site of the burrow has been carefully marked, nothing will remain on the surface to indicate its position. The normal burrow of an adult may go twelve to eighteen inches into the ground but the female with her egg-sac usually posts herself only a few inches below the surface and sometimes at this place the burrow is slightly widened. Here she rests, her sac clutched between her legs and fastened to the spinnerets by a band of silk.

PHOTOGRAPH BY E. J. STEIN

THE YOUNGSTERS HAVING A SUN BATH

They cover the mother from head to tail until she looks like an animated, over-ripe raspberry

The sac itself is round and white when newly made and somewhat larger than a cherry pit. It is composed of two hemispheres fastened neatly at the equator with a narrow seam; and it is at the seam that the young escape at hatching, doubtless aided by the mother's jaws. Before hatching, however, the sac enlarges considerably, becomes darker in color and somewhat roughened at the surface.

When the young spiderlings hatch some time in July, they climb to the mother's back. Soon after, the burrow is opened, the turret restored and the young have their first glimpse of the sun. They are minute creatures scarcely a sixteenth of an inch long, with red legs and thorax, a dark abdomen and a full equipment of proper appendages to make them resemble their parents in all essentials. There are no larval or nymphal stages to be passed through, as in the development of most insects, and the changes that accompany growth and development are largely matters of color and proportion. They live for a month or so on the yolk provided in the egg, eke out this slender diet by devouring a weaker brother or sister as opportunity offers and spend their time riding around on the back of their mother. As they grow, space is at a premium and they cover her from head to tail,—if a spider may be said to have a tail, or even a head for that matter. At any rate they cover everything but her eyes, take tentative little journeys down her legs and mill around generally until the poor harassed creature looks like an animated, over-ripe raspberry, about to give up at any time.

The watchful mother gives them a sun bath at the burrow entrance when the weather is fair, keeping a constant lookout against passing enemies. She drags them down at the slightest alarm and totes them back when the danger is past, and is altogether a responsible parent. If forcibly removed from the burrow the young scatter like a covey of partridges but the mother, courageous to her last fiber, rushes to the attack. With fore legs held overhead and jaws widely spread she lunges forward with a viciousness that is startling. If pressed beyond measure she throws herself on her back and brings both legs and jaws into play. As a last resort she is not above subterfuge and feigns death, a crumpled mass of tangled legs sagging over her body. Given a few minutes quiet, however, she turns to her feet and rushes away in short vigorous dashes.

Late in July or early in August when the young have outgrown their mother's back and their own skins and have shed them once or twice, they start on hole digging expeditions of their own. Some may wander a considerable distance but others settle down near home and sink their shafts by the mother's burrow. At this age they have a length of about one-eighth of an inch and still retain their red legs and thorax. They begin digging with their jaws, removing bits of surface soil and tossing it aside exactly as their parents do the larger pellets. As the hole deepens they go in head first and come backing out with their tiny loads. From time to time they back in as if measuring the depth and testing the shape. The miniature pit is destined to grow with the spider itself and is widened and deepened to keep pace with the rapid development of the owner. By fall the young spider may be one-fourth of an inch long.

The long winter is passed at the bottom of the burrow which, in the case of the young spider, may be only a few inches deep and certainly not below the frost line. The burrows of spiders in their second year go deeper, ten inches or so, while the tubes of the old females and others approaching maturity are sometimes excavated to a depth of fifteen or eighteen inches. In clear sandy soil, the burrow is usually perfectly straight, but where roots and stones obstruct, it swerves to avoid them. The older spiders often expand their burrows at the bottom to form little rounded cells in which the winter rest is taken.

During the spring and (Continued on page 128)

COREOPSIS

A PERSISTENT GARDEN FLOWER

BY CLARENCE E. BAKER

PURDUE UNIVERSITY AGRICULTURAL EXPERIMENT STATION

THE COREOPSIS is one of the most easily grown and satisfactory of garden flowers and is familiar to all who know only the most common of our cultivated plants. Given half a chance, it will not only survive but continue to bear a profusion of bloom throughout the summer, often thriving even in utter neglect. It is a common sight, in viewing a neglected or abandoned garden, to find that while nearly all of the more delicate flowers have died, or have been crowded out by weeds, the lowly coreopsis still blooms on as if trying to be faithful to its trust.

The genus, *Coreopsis,* includes quite a number of cultivated species, some of which are annuals and others perennials. The annual form has come to be known to the trade as *"Calliopsis"*, and many species are listed under that name in the seed and plant catalogs. Some seedsmen go so far as to list both the annual and perennial forms under the name *Calliopsis.* Bailey's Standard Cyclopedia of Horticulture, however, lists all forms under the genus name *Coreopsis,* and refers briefly to this confusion of terms.

The name *Coreopsis* is said to be derived from the Greek *koris*—a bug, and *opsis*—like; referring to the appearance of the seed, which indeed looks like a small bug. Coreopsis has few common names but sometimes it is referred to as tickseed or golden Marguerite.

Nearly all species of this genus are thought to be natives of eastern North America, from whence some

THE COREOPSIS PLANT HAS RECOGNIZED LANDSCAPE VALUE

Even before it begins to flower, its dense clumps of leaves form a splendid background for early flowers lacking foliage

BLOOMS OF COREOPSIS GRANDIFLORA
This is one of the most common varieties with large golden flowers

species have been disseminated to many parts of the world. Several species, especially, are much prized as garden flowers. The perennial species bear golden yellow flowers for the most part, while the annual species frequently shade off into reds, mahoganies and browns, with or without combinations of yellow or gold. During the last few years plant breeders have developed some beautiful varieties of the annual form in these color combinations, making splendid subjects for garden use or for cutting. Some seed catalogs now list as many as ten varieties of "Calliopsis" in various colors.

The perennial species, also, have been improved in size and beauty of flower and profusion of bloom. One of the most popular perennial varieties is known as *lanceolata;* so called for the lance-like points of the flower petals. Another common variety is *grandiflora,* one of the largest flowering species. Both of these have been greatly improved during recent years. Some interesting new forms have been introduced as well which include a variety with double flowers and one in which the petals are tubular and spaced apart, giving a quaint star-like effect.

The plant is composed of rather narrow leaves and makes a compact, bushy growth before the flowers start to bloom. During this stage the plant itself is very attractive and the perennial form serves nicely as a background for some of the early blooming flowers that have an insufficient quantity of green foliage of their own to produce the most pleasing appearance in the perennial garden. As the flower stems appear the plant loses some of its stocky appearance and becomes taller. Some varieties reach a height of three feet while others are limited to a height of ten or twelve inches. The low-growing forms are desirable for edgings along beds of higher plants where a little color is needed. The larger growing varieties are more at home among the other flowers.

The blooming season of the perennial varieties generally begins in early summer, and, if the wilted flowers are removed, the season of bloom may be extended until late autumn. This long blooming season makes them excellent plants for borders, or to brighten up a long strip of shrubbery by inserting a clump at irregular intervals. The mass of golden flowers is especially pleasing with such a background. They may also be used in this way to relieve dull spots in the perennial border or to occupy any space where a profusion of yellow bloom is desired during the summer months of luxuriant display.

The perennial forms may be grown from seed, or

THE EFFECT OF MASS PLANTING
Fitting into the picture with tall-growing plants, the coreopsis is effective

plants may be purchased from the nursery. Once a clump has bloomed and a few seeds have been permitted to mature, a supply of seedlings may be secured from about the old plant. If the seeds are sown under glass in January, plants that will flower during the first summer may be produced. When set in their permanent location each plant should have an area of at least one and one-half square feet for its future development. If the plant outgrows the space allotted to it the excess growth may be pruned away to keep the plant within bounds. The old plants may be divided when they become too large.

Seed of the annual varieties may be planted early in the spring where the plants are intended to bloom. After the seedlings are well established they may be thinned to six inches apart each way. Do not let the young plants compete with weeds and keep them well watered. They will begin to bloom in early or mid-summer and unless they are permitted to develop seed they will bloom abundantly until frost. Even seed production usually does not entirely check the bloom.

Neither form is particular as to soil conditions, nor is an extremely fertile soil either necessary or advisable. They will grow nicely on any soil of average fertility and frequently make too rank a growth on a rich garden soil.

COREOPSIS IS A GOOD MIXER
It serves well as a cut flower in conjunction with many garden favorites

ONE OF THE UNCOMMON VARIETIES
This is Étoile d'Or, which is marked by its tubular petals

They will thrive either in full sun or partial shade and while they stand dry weather nicely they respond to thorough sprinklings during hot dry spells.

As cut flowers, either form is especially suitable for bouquet work. The annuals, with their red and brown shades and mixtures, make nice bouquets either in single colors or by mixing several varieties; while the perennial yellows appear well by themselves, with annual varieties, or with numerous other garden flowers. Two or three of the golden yellow coreopsis will add life and attractiveness to nearly any arrangement of summer flowers. The foliage, also, is very suitable for bouquet work as it is graceful and of good color.

The perennial form of coreopsis usually is winter-hardy but a light mulch applied about the plants in late fall is advisable to prevent heaving during the winter in sections where alternate freezing and thawing occur. The annual varieties frequently reseed themselves and sprout in large numbers if the soil is not disturbed. In such a case it is only necessary to thin them out to the proper distance and permit them to continue their growth.

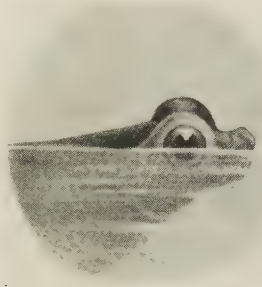
Fortunately, coreopsis appears to have no serious disease or insect pests. This is especially interesting in

light of the fact that it is of native origin and has been grown over a wide-spread area for many years. The plant is considered to be a carrier of aster yellows, a mosaic type of disease that is very serious with asters. While it attacks coreopsis it does not yet appear to be of serious consequence upon that plant. This disease causes a yellowing and dwarfing of the entire plant, the blooms are smaller in number and frequently imperfect or misshapen. There is no known remedy for this trouble but the infected plants should be removed and destroyed to prevent the infection of other plants. It is believed that the disease is carried from plant to plant only by leaf-hoppers and that it is not spread by handling. While this trouble is not widespread upon coreopsis, it is rather common upon asters and is likely to appear at any time in a more serious form, hence the above brief description. The reinfection of asters, also, may be reduced by the early destruction of plants upon which the disease is discovered.

LITTLE "FOUR EYES"

ONE OF THE QUEEREST DENIZENS OF THE TROPICS

BY HOWARD R. HILL

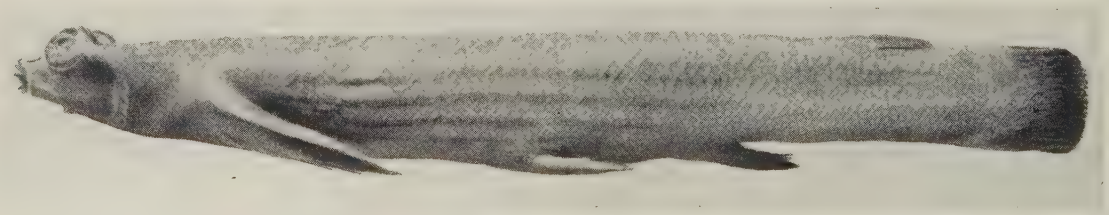


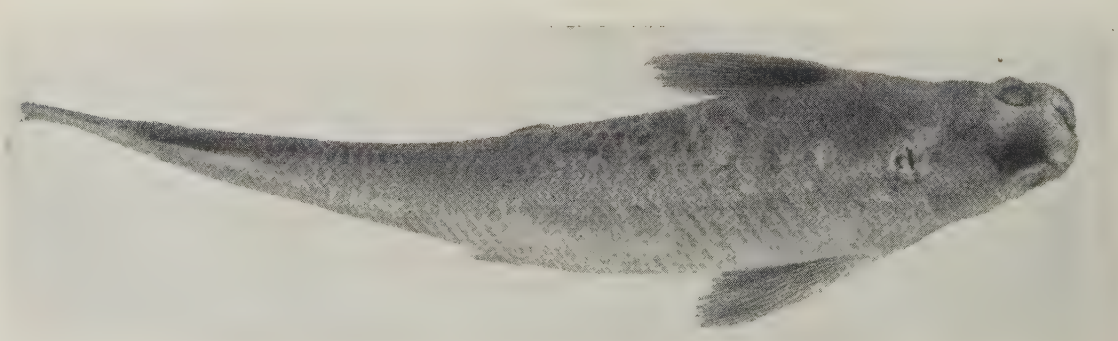
A MINNOW FREAK
His four eyes enable him to hunt both above and below the surface at once

NEARLY everyone has heard of two-headed snakes, five-legged calves and three-legged chickens—freaks of Nature, all of them. But how many people know about a fish which normally has four eyes and uses them all for seeing? Little "Four Eyes" belongs to the numerous groups of fish that are commonly called minnows. However, it is rather large for a minnow as it often grows to a length of a foot or more. Its scientific name is *Anableps tetrophthalmus,* which means "looking up four eyes," and it is the peculiar structure of its eyes that makes little "Four Eyes" so interesting. It is the only fish known that has four eyes.

The body is wedge-shaped with the head and back flattened, while large eyes protrude slightly from the side of the head. The color is yellowish with several dark stripes extending along the sides from head to tail. There is a true division of each eye into an upper and a lower section. This curious provision of Nature aids the fish in capturing its food, which consists almost entirely of insects found at the surface of the water. As the fish swims along, the top part of the head is raised above the water so that the upper eyes can be used to locate the insect food hovering near the surface. At the same time, the lower eyes, being submerged, are able to detect objects beneath the surface.

The four-eyed minnows feed in schools in the fresh water rivers and lakes of tropical America. Except for their short snouts, they might easily be mistaken for baby alligators playing near the surface. Whenever they are frightened, they will jump clear out of the water. The specimen here illustrated came from Dutch Guiana. However, little "Four Eyes" is found north to Mexico.





TWO VIEWS OF THE TROPICAL ODDITY
A side view of the little minnow, showing the projecting eyes and short snout, appears above, while the other picture reveals his flattened back and head

This is the second article in our hobby series, devoted to the Nature hobbies of interesting people whose life work carries them along much different paths

J. OTIS SWIFT

WHOSE HOBBY IS THE YOSIANS

BY ROSALIND DUNKIN STECH

A NEWSPAPER reporter who loved Nature is responsible for the formation of one of the largest outdoor groups in the world. Josiah Otis Swift, now an editor, but from early years as ardent a naturalist as a writer, heads this organization. Perhaps the most interesting thing about it is that the society's advent was entirely unsought and unintentional on Mr. Swift's part.

If he had not had a Nature hobby, there are hundreds of city-tied men and women who would still be uncomfortably conscious of pavement limitations instead of spending at least one day a week in the fresh, open country-side.

To understand how one man's hobby gained sufficient impetus to touch and influence thousands of lives—for the Yosian Brotherhood now numbers more than 50,000—we have to look back a few years and see Mr. Swift as a twelve year old.

His grandfather, the Rev. J. S. Swift, was then a pioneer country newspaper publisher in Wilton, Maine. All the time he was not busy with his paper or preaching, he wandered in the hills, observing and studying Nature. Young Josiah was a printer's devil in his grandfather's office and what time he was not inking forms and setting type, he used to collect news for a paper which he wrote, set type for, printed and sold. One of the features of that little paper was "Nature Notes."

By the time he was eighteen, he had become an all-round reporter and printer and at twenty-two was city editor of the Lewiston *Journal*. But all through his writing-printing career, he always stressed the Nature angle of any story he wrote. This was equally true of his work for the New York Morning *World*, which staff he joined before he was thirty. Even when writing of a murder, he mentioned the trees around the house or any other phase of Nature he could possibly drag into the picture. His habit of close, searching observation proved useful on many occasions. Once he went to New Jersey on a murder story. The police had been hunting the weapon for two weeks without success. Mr. Swift using his keen eyes which have spotted many a half-buried Indian arrowhead, walked through the fields and within an hour found the murder razor.

Known to the staff as "a Nature bug" it was quite logical that when

LEADER OF THE YOSIANS—J. OTIS SWIFT
Veteran New York newspaperman who has led thousands outdoors

AN HISTORIC PICTURE IN NATURE EXPLORATION
The first and only extant picture of the first group of Yosians

the *World* decided on a daily Nature feature, they turned to Mr. Swift as the one most competent to write it.

Started seven years ago, the feature, known as "News Outside the Door," won instant attention. Being a naturally modest man, when he wanted to inject a bit of philosophy into his writing, he disliked saying, "I, Josiah Swift, think thus and so," therefore he wrote, "The Yosians think." Soon letters began to pour in. One said, "I agree with the Yosians perfectly. I would like to meet them. How can I?" Another, "The Yosians must be taking wonderful walks. Could I go along? I don't know anyone here in the city and I don't care very much for the city anyway."

There were many letters in similar vein all expressing a desire to "join the Yosians." Of course the writers did not know "the Yosians" was one man and Mr. Swift did not want to disappoint these eager people who quite evidently loved Nature and wanted to know more about it. Thus was born the Yosian Brotherhood which has no dues, costs, rules, responsibilities or officers, yet is steadily growing so that its daily mail looks like a small post office. The Brotherhood has branch groups in many cities of the United States, also in Paris, London, Calcutta, Shanghai, Hong Kong and Tokio.

While there are many groups in the Brotherhood, the Metropolitan, headed by Mr. Swift, is typical. It meets Saturday afternoon or Sunday morning. For the first hour of the walk, Mr. Swift talks on trees, birds, flowers, minerals, poetry,—all the things that are suggested by what they find along their route. Then at some convenient spring they stop to eat their lunch, talk further of what they have seen and hold a community sing. Then they resume the walk for an hour or more.

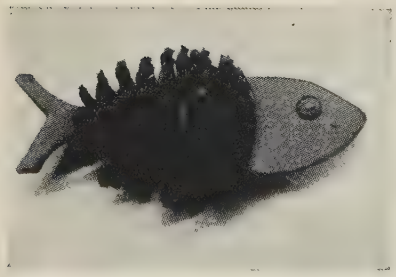
There are some very small groups. Out in Bigtimber, Montana, there is a rancher's wife who saddles her pony Sunday mornings and rides out into the hills. She writes occasionally and tells of what the Bigtimber Yosians saw on some trip, she and the pony constituting "the group."

"All down the ages there have been men and women in the world who have known that humanity could never be entirely happy toiling in the smoke and dust of towns, heaping up wealth of material things," said Mr. Swift. "To steal away to those sanctuaries of Nature, far from the marts of trade, from the crowds of the foolish, the bondage to inanimate things, for physical rest and spiritual recuperation, has been from the first the purpose of the Yosian groups."

SCOUT KNIVES MODEL REALISTIC FORMS

NATURE FORMS THEME FOR CARVING

BY WALTER MACPEEK



FISH THAT GOT AWAY

THE PINE CONE BIRD

PRESTO! Where before you just a minute ago was nothing but a bit of rope, a few twigs and a pine cone, now there is a fish, or a wading bird, or a termagent house-wife with rolling pin in hand. Shades of Houdini! Yet there was no faking here. For the materials were shaped into their realistic form by the deft work of knife and fingers belonging to the khaki-clad artisans at Camp Roosevelt, the Boy Scout Camp of the District of Columbia Council.

Many were the items decorative and attractive shaped by the nimble hands of the Boy Scouts at their summer camp. Most of the materials were picked up from the woods that fringe Chesapeake Beach. And such handicraft proved easy for the boys, used to their tools. They took their models, with the probable exception of the Xantippe, from the Nature that surrounded them, and used their alertness and originality to create unusual forms.

HIS NIBS THE WADER

XANTIPPE ON THE MARCH

AN EXPERT CARVER

IT SPECIALIZES IN CENTIPEDES

BY ROBERT SPARKS WALKER

ART ON THE RED CEDAR

The female bark borer designs these queer skeleton forms

MEN have long prided themselves that they are different from the rest of the animal world, and when all proofs have failed, have pointed to Art as the one field in which they played alone. Even here, however, they have a rival, and if the carvings are somewhat futuristic and palaeolithic, and the subject always the same, you must pardon them, for the animal artists are tiny insects—the juniper bark-borers—and they carve out their graceful pictures of house centipedes all unconsciously, while they are engaged in a more important task.

It is in the process of reproduction that the female bark-borer, a famous member of the beetle family, does her engraving, and many beetles together, working on the same tree, manage to create a great tableau—an army of centipedes, all facing the same way, on the march. Only a careful engraver, or a skilled pyrographer, could equal their skill.

The female bores through the bark on an unhealthy tree and eats away the sapwood or cambium to hollow a little groove, as she travels up the tree. Beside the groove, on either side, she deposits her eggs, one in a place, and when her task is finished, and she has played her part in the design, she dies a natural death.

The eggs soon hatch into larvae, and each begins to cut its way in a threadlike channel away from the main burrow. In the course of time it becomes fully mature and cuts through the bark to pursue in its turn its artistic-reproductive endeavors. Only the picture of the centipede is left, carved in the wood.

Some of the centipedes designed on dying trees have crooked tails, caused by the female beetle turning her burrow to avoid territory in which another one of her kind was working. They all seem to be scurrying the same way. They are of many sizes, from three quarters of an inch to two and a quarter inches.

These unconscious wood-carvers seem to believe with the Greeks that "the greatest art is to conceal art", for their drawing is done beneath the bark, and it is only when the dead epidermis drops off that the picture is unveiled.

THE CARVINGS ARE REVEALED WHEN THE BARK DROPS OFF

In the course of her egg-laying journey the female bites away the sapwood or cambium as she travels up the tree

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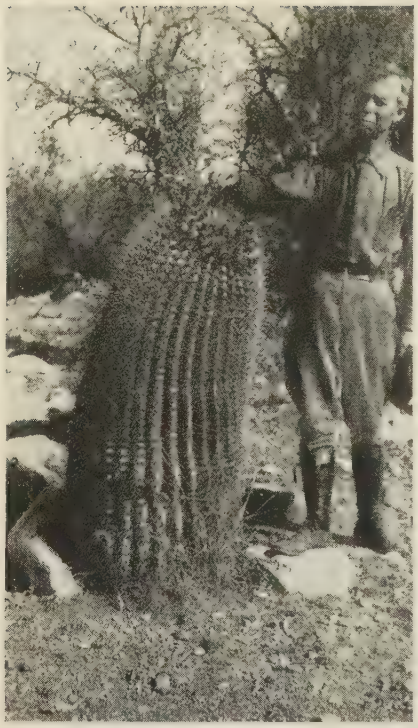
Among the outstanding features in the March issue of Nature Magazine will be a fine dog article by Lucy Salamanca illustrated by reproductions of the beautiful etchings of Diana Thorne; a coyote story by Lorene Squire; another fascinating bird story by Hamilton M. Laing and another interesting article in our Nature hobby series.



INSPECTING A CACTUS
The author tests the spines of this desert dweller

THE BARREL CACTUS

BY
VERNON BAILEY

CHIEF FIELD NATURALIST
BIOLOGICAL SURVEY,
U. S. DEPT. OF AGRICULTURE

A WATER RESERVOIR
They stand here and there over the dry, open slopes

THIS more than Camel of the Desert is one of the many water and food-storing plants able to withstand rainless years, and to bear flowers and fruit during scorching droughts that would kill less hardy vegetation. With its air-proof and water-proof cellulose jacket covered with an armor of savage straight and curved and hooked spines that even the desert burro dares not molest, it is all but enemy-proof; and still, in times of stress, it has for ages yielded its life blood to save the lives of man and beast, and thus has helped to make the desert habitable to those who brave its dreary wastes and understand its secrets.

The plants are thrifty—saving and storing and never wasting their riches. When in good years the rainfall comes up to seven or ten inches, they rapidly take up the water and plant food after every shower, hoarding the precious fluid in their million-celled hearts and keeping it all for the time of flowers and fruit. If there is no rainfall they patiently stand and wait, with closed pores and bristling dagger points, for another year, or several years, for the flowering time. Why hurry?

While of slow growth they live long—no one knows how long—often reaching a size of four to six feet in

NOW AND THEN THEY COME IN MULTIPLE FORM
Although they usually grow singly you may chance upon a group with each member the size of a keg

height and one and a half to two and a half feet in diameter. A large plant will show by the fruit scars on the ribs at each bundle of spines approximately its number of years after reaching the fruiting age. In a good year there may be two fruits to a rib, and in a dry year none, but the average may be approximately one to a year, or some twenty-six to thirty-six flowers a year encircling the crown of the plant, each of which, after the fruit has fallen, leaves a permanent scar to be seen down the side of the cactus for the rest of its life. Some old plants show rows of fifty to one hundred flower scars down each rib, and it is probably safe to credit many of the large plants with a century's growth. What a century of blazing heat and scorching winds, fierce sand storms and biting frosts! But, always between, the refreshing showers—the reward of patience and endurance.

What sacrilege to destroy one of these monarchs of the desert unless to save a human life, or to gain a more perfect knowledge of the life history of the species and a better understanding of our universe!

For careful study I once cut open a fair sized plant, about four and a half feet high and a foot and a half in diameter. Under the thick green cellulose cover, rind, or bark, the body of the plant was a firm white cellular pulp, like the flesh of an apple, or of an unripe watermelon, almost tasteless, and in this case ninety-four per cent pure water. To learn the water content I cut a one-inch slice across the middle of the plant, and one-eighth of this circle cut from the center to include rind and spines weighed just one pound. When thoroughly desiccated this slice dried down to one and a quarter ounces, showing a loss by evaporation of ninety-four per cent of its weight. This gives a weight of eight pounds to one inch of height of an eighteen-inch cactus, or roughly about four hundred pounds weight to this four and a half foot high plant, about three hundred and sixty-eight pounds of which is water. This would mean about a barrel of water to a large Visnaga, and suggests the origin of the name *barrel cactus*. More of the plants, however, are keg-size rather than barrel-size, but kegs and barrels of water standing around on the desert in plain view to thirsty animals for a half a mile or a mile away have a need for all their spiny armor. There is also need for a human sentiment for their protection that will save a few for future generations of plant-lovers to enjoy.

The water is good and wholesome and easily obtained. Squeezed out of the crushed pulp it is slightly greenish in color with a squashy taste, but cattle and rabbits and all the little rodents and birds are eager for it, and to a thirsty man it is grateful and refreshing. If one of the plants is cut or injured so as to leave an opening between the spines the whole inside will soon be eaten out by the desert animals. If large pieces of the snowy heart are left out over night cattle and rabbits soon find and eat them, apparently just for the water. The pulp seems to have little or no food value, and no trace of sweetness or any pleasant flavor.

AN ARMORED BARREL OF WATER

Atop it is a full cluster of ripe, lemon-yellow fruit capsules

At Benson, Arizona, two prospectors loaded their buckboard with grub and camp supplies and started in the early evening for a sixty-mile waterless drive across the desert to their camp and claim. About nine o'clock next morning they returned with an unconscious man in the bottom of the buckboard, picked up on the road half way to camp, overcome with thirst and exhaustion, an empty canteen but some provisions still in his pack. He was turned over to the local hospital and brought back to life. To be sure, he could speak no English, and was not familiar with the country, but if he had recognized one of the many Visnagas along the way as a water barrel he could have completed his journey in comfort. He was only one of many unfortunate desert travelers, generally less fortunate than he, who could have been saved much suffering by a little knowledge of the secrets of the desert. In this case, with the unfortunate stranger cared for, the two miners, with typical nonchalance of the trade, refilled their water keg, fed and rested their horses, and started again for their mining camp for another month of hard work in a rocky canyon. I did not even write down their names, but credited their golden deed to a type, bred of hardihood under

the desert sun. Long may they thrive, and do their work.

The Visnaga is another type of desert life, standing ready to save lives, and worthy of our admiration and protection, and of a human sentiment that will save it from wanton destruction or commercialized extinction. And there is danger. Often by the roadside a beautiful plant of a century's growth, crowned with a wreath of yellow flowers, or a circle of golden fruit, has been wantonly slashed or chopped, or mutilated by human hands through idle curiosity or ignorant depravity.

A still greater menace is the growing industry of *Cactus Candy*, for which hundreds of these plants are brought in, the crisp and sparkling hearts cut into small squares, boiled full of sugar and flavoring and made into a confection, very delicious, but owing none of its virtue to the cactus except the novelty of the name. A piece of melon or pumpkin or squash would do as well for a matrix to hold the sweet. Let them call it cactus candy if they wish. That would be as near the truth as advertising it as made from the giant cactus, which, with its bundle of poles in the center, fortunately would not lend itself to such fatal use. So extensive has the cactus candy industry become, that the candy is advertised and sold in many of our larger cities over the country on a scale that seriously threatens the extinction of one of the characteristic and interesting features of the desert.

Must the millions of us who enjoy the unique treasures of desert life be robbed of our share in these treasures for the profit of a few who would exploit the public domain and leave it bare? Let's protect and save some of our natural wealth for future generations to share and enjoy. Then we shall merit, and receive, their respect.

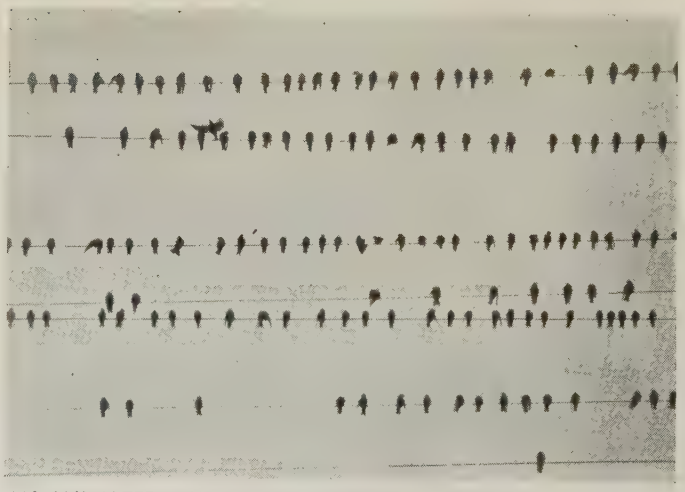
THERE ARE 640 MARTINS IN THIS PICTURE

They crowded the wires as they settled down for a night's rest

WHEN MARTINS GO SOUTH

BY F. L. DUMOND

A WINGED legion of purple martins, 1,000 strong, stopped off for a few days' rest in Grand Rapids, Michigan, while enroute to its wintering grounds in northern South America. For a number of evenings they assembled in full force at one spot and made the wires look like a gigantic animated music score for several hours before darkness fell. Preparations for the night included a careful preening of the feathers. Now and then a few impetuous members of the flock took turns winging upwards to glean a few vagrant insects from the tranquil air. Their return to a crowded place on the wire was heralded by a soft twittering which seemed to say: "There is plenty of room up ahead. Move forward, please!"



AN ANIMATED MUSIC SCORE AGAINST THE SKY

But the melody and accompaniment kept changing as adventurers soared for insects

Each twilight their ranks were augmented until no less than one thousand four hundred individuals were present. Many an interested spectator observed their refueling methods and their aerial maneuvers. At last, however, they took off for the land where insect food is never-failing and the Frost King is unknown. Some sign, unseen by human eyes, told them that the time for departure had come.

WHEN NATURE TAKES HER CUE

GIVEN HALF A CHANCE, SHE WILL REBEAUTIFY THE HIGHWAYS

BY TOM WALLACE

EDITOR, LOUISVILLE, KY., TIMES

THE Gods of the Japanese favored me one rainy June in Japan and I saw Nikko, with its temples, its sacred bridge, its silvery river, its highland gorge, its pines. But what I remembered best, and still remember best, was an avenue of giant cryptomerias, all the trunks exactly the same size, the spaces between them equal in every case; enormous slate gray cedar-like trees, approaching redwoods in dignity of dimensions, constituting an avenue leading to the temples.

The cryptomerias made a perfect forest aisle in an unforested country, as dim and still as the nave of a Gothic cathedral, a thrilling spectacle of grandeur. No architecture in Asia—and I had seen much of Saracenic architecture at its best, in Delhi and Agra—impressed me as did that gorgeous tree-pillared way.

WHEN THE FOREST RETURNED

In eighteen years, a pasture trampled for a century became, under protection, a beautiful thicket

And as I stood beneath the arching canopy, I thought of the possibilities of ornamentation of roads in the United States by so simple a process as planting native forest trees, of selected species, protecting them and standing by for the sure result.

The individual of course cannot await, with hope of seeing the full result, the growth of a tulip tree, much less the full development of an oak. But lives of states and lives of men are different, and state-making must proceed upon a basis of recognition of the fact that results of reckless destruction cannot be obliterated, and the dignity and beauty of Nature restored by, and for, the individual.

Tree protection, under roadside tree laws, should be fundamental in every plan of road improvement. Tree planting, and guardianship, as part of maintenance, with recognition of the fact that forest trees are more nearly permanent than any type of road surface now known, ought to be everywhere undertaken. The slogan should be, borrowing from Omar: "Quick, quick about it, friend!"

Reasons practical as well as esthetic demand roadside beautification. Shade makes summer driving comfortable. Tourists, who spend $3,000,000,000 a year seeing outdoor America, in automobiles, are partial to shady and beautiful roads. Land abutting upon tree-lined roads has an advantage in the market for rural real estate.

Road denudation has progressed because pole and line companies butcher trees to make clearance for wires, because road broadening, often necessarily, strips narrow roads of trees of natural growth through the actions of ignorant road gangs who destroy roadside bushes as if they were weeds, or briars, even when they are under instructions not to destroy trees.

Where Nature is given half a chance she will adorn roadsides without expense to anyone wherever the forest root system has not been destroyed by repeated denudation and the tramping of livestock.

I can readily prove the above assertion. I have seen trees come back on my farm. The tract was only eighty-seven acres when I bought it, eighteen years ago. An eighty-seven acre farm endures hard usage, and this was a typical small farm except that the rougher parts of it had been left in timber by an owner who succeeded his father, a German pioneer. The land had been in use since the very beginning of the Nineteenth Century.

I had a "three wire" fence put along the driveway from a valley pasture to the hilltop on which the residence stands, to protect a ravine on one side and a steep slope on the other from cows which were to be driven to and from the valley pasture.

I fenced the hill pastures, on either side of the road, leaving denuded and in some places eroded belts between pasture fences and the road.

No tree was planted. The growth shown in the illustration is simply that which the fences protected from the browsing and stamping of cattle.

At first the growth was almost wholly locust and elm. "Scrub elms", farmers said. "Trash" which should be cut out. But they are good elms now. And here and there among them are sycamores, brisk and ambitious tulip poplars, smaller, but healthy and coming, rock maples. Here and there a hickory, thanks to a forgetful fox squirrel who carries nuts from a hickory on the hill, digs them in for future use, and cannot remember where he put them. And many walnuts, similarly planted.

There are also a few hackberries and wild cherries, and spicewood bushes are appearing. Not an ideal assortment of forest species, yet a fair result from an experiment involving no outlay except allotment of a strip of useless land, plus the cost of three thousand feet of "three wire" fencing. I venture to say that it would be possible to rebuild the present residence on the farm with logs cut from the land, if tulip trees, black walnut and locust were used, instead of the ash and beech of which the house is made.

Farmers who laughed fifteen years ago at my wire fences and my little bushes now admit that the trees add value, and beauty, to the farm. And here, on the scale of a laboratory experiment, without the advice of a forester—for I am only a journalist—is an illustration of what might be done upon hundreds of thousands of miles of roads, public and private, without much expense.

I know a millionaire, in central Kentucky, who afforests his roadsides, in preference to planting them formally, with spaced trees of selected varieties.

The effect he has obtained, by expensive planting, is better than that I have secured by fencing merely. But eventually, under protection, my roadsides would be like his, with samples of the native forest, with dogwood and redbud, elm and oak, maple and ash, and wildflowers under dogwood and redbud, and ferns along the brook.

This year for the first time the violets appeared, almost carpeting the ground where there were weeds and briars till the increasing shade killed them. Next, no doubt, there will be spring beauties, Dutchman's breeches, larkspur. Maybe, ere long, Virginia bluebells, jack in the pulpit.

The forest is returning, without the hand of man being raised in any fashion to aid Nature's work.

NEWLY UNFOLDED LEAVES

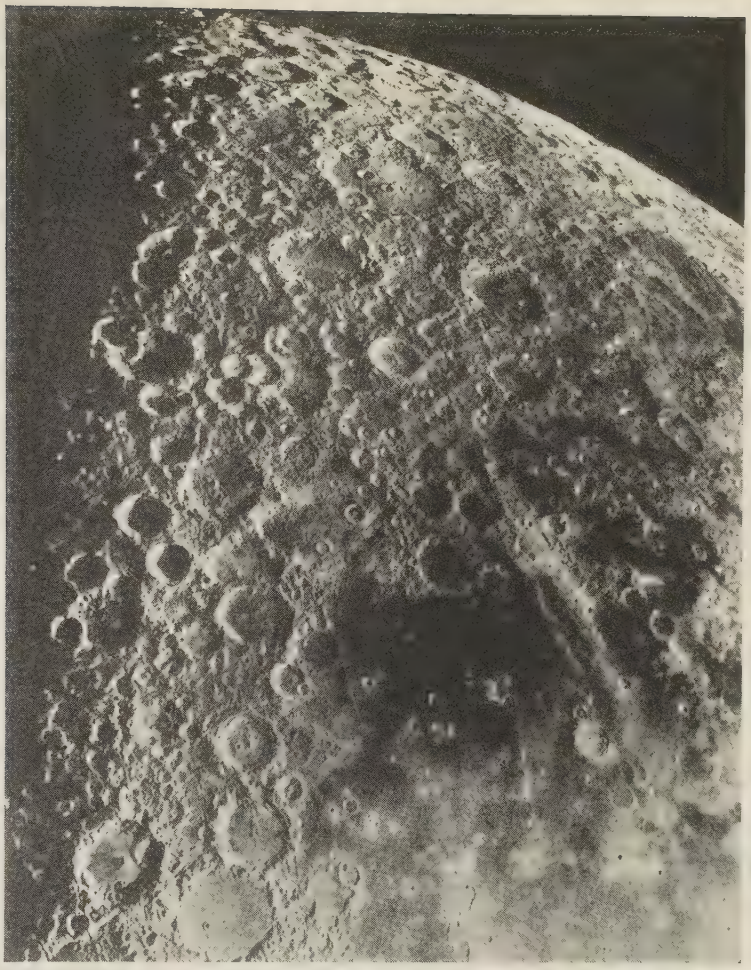
The horse-chestnut buds show, by fan-like folding and the angle at which the leaf is bent from its stem, the lasting effects of good packing

GOOD PACKING

BY FRANK THONE

WHEN our children play with the little Japanese paper toys that unfold into flowers and fruits when floated in a dish of water, we marvel almost as much as they do over the wonderful skill and patience of the Oriental workmen who made them. Yet remarkable as are these paper creations, they are after all only imitations of the leaves appearing each spring.

If one of these Japanese toys is taken apart with a pin, in the tightly-rolled pellet will be found all the parts that later unfold before our eyes. Similarly, if one picks open a winter bud on tree or bush, he will find packed away the leaves that later burst apart the covering scales and spread themselves in the spring sunlight. And just as the unfolded toy still shows traces, in the position of its parts, of the manner of its folding and packing, so also the developed leaf may show signs of its long sojourn in the tight quarters of the winter bud. The corrugations on an elm leaf, the slightly troughed middle line of the lilac, the creasing of the five leaflets of the woodbine, are all reminiscent of the positions in which the leaves spent the preceding winter, waiting for the right temperature to call them.



COURTESY MT. WILSON OBSERVATORY OF CARNEGIE INSTITUTION OF WASHINGTON

THE MOON AT THE LAST QUARTER

Photograph of the southern portion taken at Mount Wilson Observatory

ON THE MOON

HOW LACK OF AIR AND WATER PRODUCES WEIRD EFFECTS

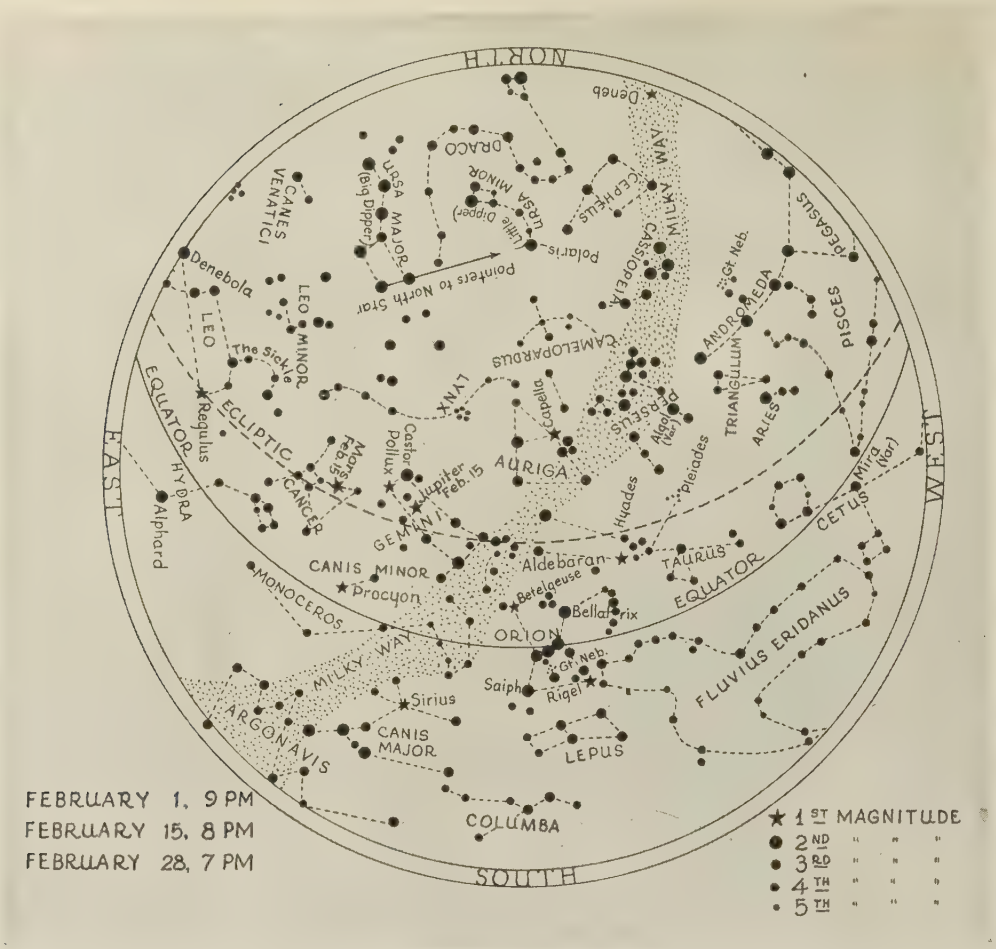
BY ISABEL M. LEWIS

ALTHOUGH the moon is nearer to the earth than any other heavenly body, separated from it by a mean distance of only 240,000 miles, it would be difficult to imagine two worlds more unlike.

On the earth we have countless forms of animal and vegetable life, great seas and lakes, forests and fertile plains, snow-capped mountains, rivers and waterfalls, clouds, rain and snow, blue skies and beautiful sunrise and sunset hues. On the moon there is no life, so far as we know. We do not see how it could possibly exist there though the idea has been advanced at times that in cracks and crevices of the lunar surface, or in low-lying regions, there might exist some forms of life supported by a meagre supply of surface vapors. There is, however, no sign of the existence of any life upon the moon. Certainly there are no fleeting clouds, no oceans, lakes, seas or rivers, no blue skies or sunsets, for these are atmospheric effects and there is no atmosphere on the moon.

On the moon all outlines are harsh and rugged for there is no erosion or weathering of the surface. Lofty mountain chains exist there, possibly snow capped, for though there is no water in this strange world there may be snow and ice that never melts. All is desolate and silent. Vast rock-strewn plains are pitted with thousands upon thousands of saucer-shaped depressions, many with terraced walls and lofty central peaks, the much-discussed craters of the moon, the origin of which has been such an enigma to scientists. Strange rays, emanating from some of the craters in all directions, apparently splashings of some light-colored substance, extend in some instances for hundreds of miles. Their origin also is unknown, though those who believe in the meteoric origin of the lunar craters think that they were formed through the impact of great meteoric masses with the lunar surface. These rays are most conspicuous around the craters Copernicus and Tycho. Around Copernicus they form a feathery network of markings, but from Tycho they extend for distances of a thousand miles or more in all directions almost as sharply defined as meridian lines upon a map. The appearance is that of a great globe that has been cracked by the effect of a terrific blow.

It is the appearance of the lunar heavens, however, that would most impress the terrestrial observer. By day as well as by night the stars and planets shine with a splendor beyond our powers of imagination in a sky of inky blackness. Since there is no atmosphere there is no diffusion of light. The "seeing", as the astronomer would call it, is



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south

perfect. There is no atmospheric haze or vapor to dim the luminosity of the stars. The sun viewed from the moon is an object of far greater splendor than we can imagine. There would be no need for eclipse expeditions upon the moon for the solar corona is always visible, its weird ethereal light extending from the solar surface in the form of long streamers and arches, constantly changing in form and appearance. The vividly colored chromosphere and the enormous solar prominences of scarlet hydrogen and calcium vapors bursting forth continuously to heights of thousands and at times even hundreds of thousands of miles are to be seen at all times on the moon. It is only the diffusion of light by our atmosphere that prevents us from seeing the corona and prominences at all times from the earth.

To the lunar observer, if such there were, the most interesting object in the heavens would undoubtedly be our own planet Earth. Viewed from the moon it would appear four times as great in diameter as the moon and sixteen times as great in surface area. As the moon revolves around the earth it always keeps the same side turned toward us, but due to the effect of librations we sometimes see a considerable distance around the edges of the moon, alternately north and south, east and west. As a result there is only about forty per cent of the lunar surface that is never seen from the earth, forty per cent that is always visible and an equal portion of the surface that is alternately visible and invisible. So if one were near the center of the visible surface of the moon the earth would swing slowly back and forth in the heavens in the course of the lunar month like a great pendulum. Near the edges of the visible lunar surface the observer would find it alternately appearing and disappearing at the horizon. Were he to continue his journey around the moon he would soon find himself upon a portion of the lunar surface where our planet is never seen.

What a wonderful sight our planet Earth must be in lunar skies! It shows phases similar to those of the moon, depending upon its position in the sky relative to the sun. During the lunar night of a fortnight in duration the rugged lunar surface is flooded with earthshine which is far more brilliant than moonlight. An eclipse of the sun viewed from the moon would occur at the time when we, on this planet, are seeing an eclipse of the moon. A total eclipse of the sun seen from the moon might last about two hours but on the earth it can last at most only seven and a half minutes. When the moon comes between earth and sun and an eclipse of the sun is seen from the earth the lunar observer would see the shadow of the moon speeding across the surface of the earth with ter-

rific velocity. The rotation of the earth on its axis would bring before the lunar observer a series of observations of never failing interest. What a world it would be to observe through a great telescope set up on the surface of the moon! The great 100-inch Mt. Wilson reflector will reveal an object on the surface of the moon that is only one quarter of a mile in diameter. What an opportunity a lunar astronomer would have to make discoveries on a world such as ours with the Mt. Wilson reflector! What a wonderful map of our world could be made from the moon! All of our continents and islands, oceans, lakes, and seas would be clearly visible; even our larger cities would be easily seen in a telescope as dark spots. Fleeting clouds and storms of rain and snow, the signs of growth and decay of vegetation we can imagine would be of intense interest to the lunar astronomer.

A terrestrial visitor to the moon, even if supplied with air and able to adjust himself to the absence of atmospheric pressure, would find his visit attended with many unpleasant features. To be sure a decrease in his weight to only one-sixth of what it was on earth would be a great advantage in mountain climbing, of which there would be plenty on the moon, but on the other hand he would soon find the extremes of temperature beyond his power of endurance. Exposed to the direct rays of the sun his skin would be burnt and blistered by the intensity of its heat while if he should step into the shadow of a rocky cliff he would experience a drop of temperature of several hundred degrees Fahrenheit. In addition he would be exposed continually to the fall of meteoric masses ranging in size from small grains to rocks weighing anywhere from a few pounds to several tons. There would be no atmosphere to consume these meteors by friction either partially or entirely, as is the case on our planet, and they would therefore strike the surface in much greater numbers and would greatly exceed in size the meteors that reach the earth.

The question of the origin of the lunar craters still appears to be far from settled. There are strong advocates both of the theory of meteoric origin and of the theory of volcanic origin and there appears to be no decisive proof in favor of either. A number of facts may be cited both for and against each theory. Any one who is particularly interested in the theory of the origin of these strange lunar formations need not be dependent upon a telescope for his investigations because remarkable large scale photographs of the entire visible surface of the moon have been taken with the 100-inch Mt. Wilson reflector and are obtainable from the Mt. Wilson Observatory at a very moderate price. Excellent photographs of the moon are also to be obtained from the Yerkes Observatory at Williams Bay, Wisconsin, showing the moon at all its different phases and all of its characteristic markings, craters and mountains, rays and clefts and rills. With these at his disposal one may judge for himself the merits of rival lunar theories or possibly build theories of his own and incidently become better acquainted with some of the most remarkable surface features of our strange little satellite.

February skies to our mind are even more interesting than those of the two previous winter months. The most interesting winter groups are now visible in the early evening hours and there are more evenings when the cold is less intense and when, consequently, star-gazing is more comfortable. Orion is now due south at nine o'clock in the evening. You cannot miss him as you turn southward. To the northwest of Orion you will see Taurus with the Hyades and the Pleiades and the brilliant Aldebaran, to the northeast Gemini, and south of Gemini, Procyon, the Little Dog-Star, and some distance to the south and west of Gemini, Sirius, The Dog-Star, brightest star in the heavens. Sirius, Procyon, and Betelgeuse, in Orion, form a great, nearly equilateral triangle. The extension of the line of three stars in the Belt of Orion to the southeast will also bring us to Sirius. Two planets are now visible nearly all night. Jupiter is in Gemini a few degrees west of Pollux, the brighter of the two twins, and Mars is in Cancer, a few degrees southeast of Pollux. With the two twins, Castor and Pollux, they form a brilliant group. Mars passed opposition last month and next to Jupiter and Sirius is the brightest object in the evening sky. Venus is now a brilliant Morning Star and reaches its greatest western elongation on February 1. Saturn is also visible in the early morning sky in the southeast and is in conjunction with Venus on February 25. Mercury has just passed western elongation and may possibly be seen the first few days of the month in the southeast before sunrise. It will be in conjunction with Saturn on February 1.

The next special geographical number of Nature Magazine will appear next May and be a Carolina number, covering North and South Carolina. Assignment of articles for this issue has already been made. The editorial department is, however, interested in receiving for consideration good photographs of birds, mammals, flowers, fishes and other good illustrations along Nature lines. Usable pictures up to the high standard of Nature Magazine will be purchased at our regular rates for such illustrations. Since this issue will be written by Carolinians we would like to illustrate it with pictures from the same two States

WESTERN TRAILS

VOLUME 1 | FEBRUARY, 1931 | NUMBER 2

"Western Trails" is the Alumni Bulletin of the Vagabonds of the Trail, the folks who have followed the trails with the American Nature Association. It is dedicated both to those who have graduated from these fine summer experiences, and to those who have indicated an interest in the trips but who have not yet graduated from a trail trip

PERSONALS

Kate Huber, Glacier '29-Jasper '30, flew back from the reunion in fine shape. She'll have her own plane yet.

* * *

Skipper Higgins of the *Caroline* is inspecting hulls for Uncle Sam at Juneau, Alaska.

* * *

Art Staton, our handsome Glacier guide, has been in Evanston, Illinois, this winter. Art wants a dude ranch.

* * *

"Doc" Bulger, Glacier '29, sent us some fine pictures of his trip to the Southwest. He had a great time.

* * *

Dena Lindley, Glacier '29, is planning to spend the winter in Florida.

* * *

Myra Hunter, Glacier '29, is on sabbatical year from the Brooklyn Schools at Williamstown.

* * *

Art Pack has chartered the *Westward* for a six-weeks trip camera hunting in Alaska. Bill Finley will be along.

* * *

Helen Dolman, Glacier '29, is a contributor to the new edition of the *Nature Almanac.*

* * *

Helenita Topping, Glacier '29, has, we understand, said, "Yes." Congratulations to the lucky man.

* * *

Podge Field, Glacier '29, has a horse all her own. Dad Field, Glacier '29, says Podge wants to sleep in the barn.

* * *

Caryl Parker Haskins and his mother, Yellowstone-Jasper '30, have left for a trip around the world.

* * *

The Editor of the Personals column would like some more personals. Please write him and tell him what you are doing. Advt.

TREASURER'S REPORT

President of the Vagabonds, Antoinette Wilson, after the rush of the reunion had subsided, paid all the bills and turned over the balance of the treasury to Dick Westwood, Secretary-Treasurer. This balance of $13.61 has been safely deposited in the Riggs National Bank awaiting advice as to some safe, interest-bearing investment for the disposal of this large sum. Financial geniuses please note.

"WESTERN TRAILS" FOR 1931 BEING COMPLETED

Final Details Are Gathered on the Year's Plans

For the past two months Dick Westwood, Director of Field Trips, and Betty Ridsdale, Assistant Director of Field Trips, have been gathering figures from all over the place. They have been interviewing railroad agents, studying time tables and planning itineraries. All these details have been got in final form for the issuing of "Western Trails" telling of the 1931 trips.

This booklet will be sent to all the folks who have inquired in the past about these trips. It is hoped that it will be possible to mail it about the time this issue of Nature Magazine reaches you. However, in the Travel Department of this issue the general program will be found to be briefly outlined.

Folks who have not been on the trail with the Vagabonds or who have not written about the trips before, may receive a copy by writing to the Director of Field Trips, Nature Magazine, 124 16th St., Washington, D. C.

YOSEMITE TRIP CALLED UNIQUE

Original Route Is Taken for Visit to This Park

"You can certainly say that your itinerary in Yosemite is different," declared Dr. Harold C. Bryant, Assistant Director of the National Park Service and father of the Nature Guide Service. In fact, Dr. Bryant is mainly responsible for the original way of visiting this Park by the Vagabond party this year.

The usual plan of visitors to Yosemite is to go directly to Yosemite Valley, either by way of the customary entrance by way of Merced, or by way of the Tioga Road. Thus they get the climax of the trip first. The Nature Magazine party will approach from Lake Tahoe, after a day and night at this wonderful mountain lake, stopping at Tuolumne Meadows. From there they will hike by gradual and easy stages to Glacier point, saving the climax until the last, and first viewing the glories of Yosemite from above. Then they will go down into the Valley and view the beauty from below. Through the cooperation of the Yosemite Park and Curry Company it has been possible to arrange this distinctly unique method of approach.

TO VISIT SEQUOIA

Col. John R. White, Superintendent of Sequoia National Park, is justly proud of this wonderful area, and he earnestly urged a Vagabond party to visit him. It has been possible to work out a feasible schedule joining Yosemite and Sequoia at little added cost. It was felt that it would be a shame to be so close to Sequoia and not become acquainted with its magnificent charms.

WEDDING BELLS

Yes indeed, just listen to them ring. Betty Ridsdale's Ma and Pa have announced the engagement and the lucky man is Donald Fenton McCall, Michigan citizen, Dartmouth graduate, fine fellow, lucky—and how. The event is expected late in the winter. Patsy will be maid of honor, or maybe ring boy. Do I hear nomination of Don as a member of the Vagabonds? Seconded? All in favor say, "Aye". Opposed, "No". It is unanimous. Welcome Mr. McCall and congratulations.

LAKE LOUISE AND BANFF GOALS OF VAGABONDS

Trail Trip Planned to Canadian Rocky Beauty Spots

Linked this year with the tri and true trips in Jasper and Gl cier, is a trail trip to the Canadi Rockies around Banff and La Louise. Opportunity is offered visit Jasper in conjunction wi this wonderful country, or Ban and Lake Louise in conjunctio with Glacier. In fact, all three these centers can be taken series, making one of the most markable trail trips imaginable.

There is a difference about t country in all three of these se tions, despite the fact that th are all in the Rockies. After o has seen all three, and has visit them as a Nature party does, o comes to know and understa the great northern range as fe can do. The Banff and La Louise trip, of course, can taken separately if desired.

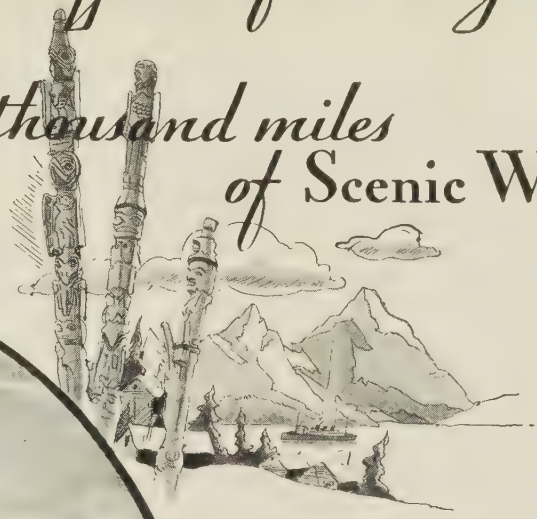
CARIBBEAN CRUISE PARTY SAILS

Fine Group Off for Warm Climes on the Caledonia

Led by Mr. Thomas H. Gi tropical specialist, and accon panied by Mr. Arthur Newto Pack, President of the Americ Nature Association, and Mr Pack, the American Nature Ass ciation Caribbean party sails January 24 for eighteen days summer waters, visiting summ lands. A fine group of folks, ca rying on the traditional fello feeling of the Nature trips, h enrolled in this cruise. Someo has suggested that the me bers of this party be known the "Vagabonds of the Sail Since not much vagabondage required on such a luxurious appointed vessel as the *S.S. Cal donia,* and since it doesn't ma much use of sails, it seems though these folks would do be to enroll themselves with t Vagabonds of the Trail.

Through the famous fjords of the Pacific to

ALASKA *a thousand miles of* Scenic Wonders



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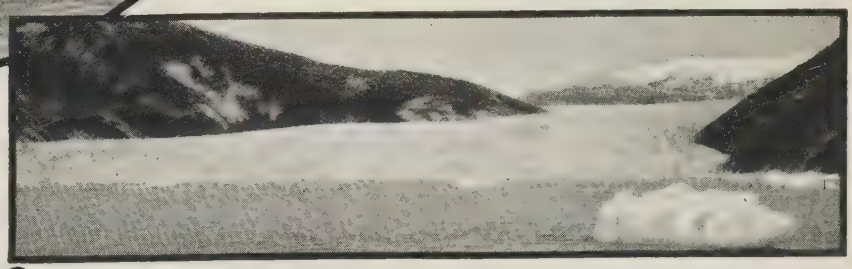
Finally, Alaska itself! . . . land of the midnight sun . . . of "sourdough" and huskie . . . of giant flowers that bloom with fierce magnificence in a brief summer. $90.00 and up, round trip from Vancouver, Victoria or Seattle to Skagway; all outside rooms in luxurious steamers. Write for illustrated booklets.

This Alaska trip is one of 50 travel films Canadian National will show *free* in your home, your club or your church. Apply to any of the offices listed below.



As you near Skagway, the beautiful Taku Glacier lines the shore. Relentlessly the mountain snows drive this river of ice on its slow way to the sea—force it to discharge the little bergs that dot the water.

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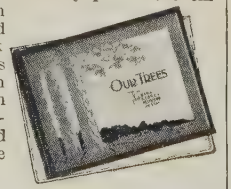

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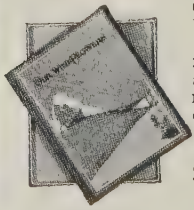

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Helps and Hints

FOR HOME AND GARDEN

PLANTING THE GARDEN, MONTH BY MONTH

By Romaine B. Ware

IN FEBRUARY the backbone of winter broken and we who impatiently long fo spring can begin to see joyful days coming It is to be hoped that as good gardener you have not lost all interest while th earth has been held in winter's icy grip. Th season for outdoor activity will soon b here and if you are to be ready do no wait too long to start. Seeds should b ordered, hotbeds and cold frames mad ready, but as important as anything is th making of plans. So many of us hav dreamy ideas about the garden we woul like to have, but often they never materia ize. The only way to make our dreams com true is to put them into some definite form Garden ideas and plans should be put dow in black and white where they may b studied over and over.

It makes no difference whether your ga den be large or small, you will get muc further if you first plan it out on paper. Yo do not need to be a draftsman or an artist draw a garden plan. The easiest way is procure a large sheet of cross-ruled pape and, allowing each square to represent si inches or a foot of garden area, plot ou the entire yard. Measure and locate all pe manent objects, the house, garage, tree fences, walks and gates. When you g through you will have a complete diagra of the area to be developed. With this pl plan you will be more easily able visualize the garden you want. If there a some flower borders already planted, i dicate them.

With the rough plan you are ready draw into it the new features you have mind. On paper you can draw and r draw till you get just the effect you wan If mistakes are made, they are easily erase and by the time outdoor work may started you will have a much better id of what is wanted and how to go about

Most every garden-lover longs for a ge erous planting of roses. If you did n plant liberally last fall, early spring is t time to get them into the ground. T sooner they are planted after it is possib to work the soil, the better chance they w have of producing quality blooms. Rose like most other plants, make much ro growth during the cool months and fr quently it is this root growth that spe success in the season to come. Get orde for roses off at once and insure for yo garden a generous showing of the "Que of Flowers". Do not be misled into t purchase of cheap own-root plants, as, e cept in the extreme South, they are not satisfactory as two-year-old budded stock.

Maybe you are one of the extra bu gardeners who do not have time to st seed indoors or to run a hotbed early

e season. You may still have plenty of dlings when the time comes for plant- them out if you will just plan in ad- nce. In every section there are florists who ll be only too glad to start seeds, trans- nt them into flats and bring them along dy for you at planting time. An ordinary d flat contains about a hundred plants ll generally one packet of seed of each iety wanted will be sufficient to give you flat. You will find that a half dozen to lozen flats of annuals will go a long way wards making your garden a real joy ough the months to come. The prices rists ask for thus starting seeds may vary newhat, but a dollar a flat is about right.

If you are starting seeds indoors, be sure soil is right. Soil that is too heavy, that ks leaf mold and sand, will hold moisture her than drain properly and will pack hard that the tiny rootlets have diffi- ty in penetrating it. The proper mixture oequal quantities of good garden loam, verized leaf mold and sharp, clean sand. shore sand is not as desirable because is not sharp sand. Mix your soil thor- ghly; this is best done by passing it ough a screen. Make sure the seed beds well drained by putting a one-inch layer gravel, coarse ashes or similar material the bottom of the container. Poorly ined soil is responsible for many failures th seeds and tiny plants.

n your seed planting this year try some ferent things. Did you know that dahlias as easy to grow from seed as zinnias? y bloom the first year and make tubers t may be carried over and propagated subsequent years. But do not count on ing flowers like the prize winners seen the dahlia shows. Only one plant in ny thousands will show such quality, it is the test of a true plantsman that be willing to recognize the inferiority his seedlings and not attempt to propa- e them. Now and then the small grower seedlings, the ordinary amateur, gets one outstanding quality. It is all a great mble and a most fascinating hobby.

lia seed is offered by seedsmen in mix- e and also hand-picked from some of the icest varieties. If you want to try some resting experiments, get a package.

For many years delphinium hybridizers e been working to secure a high quality, e white variety equal to the better strains the blue. A year ago a grower out in gon was fortunate in getting several fine ones and he has been selling them n in this country and abroad. He has ued them "Pearl Necklace", "White er", "Snow Bound" and other charac- stic names. He also sells seeds of these te varieties at $5.00 per packet. This seem high; but if you should get two three choice white seedlings, it would be t worth while. Delphiniums start easily n seed which is best sown in a raised l frame that drainage and moisture may

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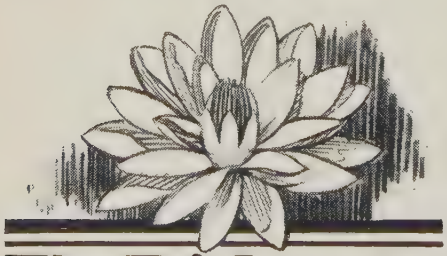

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be the more perfectly controlled. If started early in the spring in a greenhouse, many plants will bloom before frost.

Try some of the better annuals, the Sunshine Asters, the Calendula "Campfire", large-flowered Salpiglossis, Dianthus "Sweet Wivelsfield", Mammoth Column Larkspur, Giant Scabiosa and many others. Annuals are absolutely indispensable for mass color effects, either by themselves or to fill in among the perennials in the hardy border. Use them in groups of a dozen or more, crowd them in everywhere and they will liven things up wonderfully. In all seed planting keep careful check on what you plant and how long it takes to germinate, and later note the final results. Such records become valuable in years to come.

In addition to the varieties mentioned in these columns last month, the following should be started at once—stocks, begonia, heliotrope, pansies, forget-me-not, snapdragon, verbena, vinca and cobaea.

It is not too late to put in a little time studying various phases of gardening. Fertilizers are little understood by the average gardener. The book, *Fertilizers for Greenhouse and Garden Crops,* by Laurie and Edmond (De La Mare, 1929), is excellent for the amateur and much may be learned from it. Once you fully understand the principles of plant feeding you have solved many knotty problems.

Where the soil may be worked, it is not too early to plant sweet pea seed. Too, it is perfectly practical to start seeds of sweet peas in pots or flats in the cool greenhouse or cold frame. Nearly everyone, in planting sweet peas, sows them too thickly. To develop quality plants, spacing them six or eight inches apart in staggered double rows and pinching them back to cause branching will give better blooms and just as many in a given space. This is especially important with choice, high-priced seed. Deep preparation of the trench where sweet peas are to be planted always pays, as the roots like to go deep in cool soil.

In your garden planning be sure you provide for a background to your borders. All kinds of flowers make a better showing if there is a fence, wall or mass of shrubs against which they may display their beauty. Background plantings also may serve to screen out objectionable views, to add privacy to the yard or garden as well as making an artistic setting for the garden as a whole. The particular background material will depend upon the size of the yard. Shrubs and even trees can be used upon large lots, but where the area is limited they will take up too much room. Carefully kept trimmed hedges, walls or vine-clad fences are ideal in yards of limited areas. If you contemplate adding any shrubs or trees to your plantings, they should be set out as early in the spring as the ground can be dug. Now is the time to make plans.

Every week from now on there will be more and more evidences of the awakening of spring. In many sections late February sees some of the earliest bulbs waking up from their winter's sleep, adding just a bit of color as a start of the spring display. The red-twigged dogwoods are brilliant now and soon there will be plenty of color on every side. Spring is on its way North and we will hope it does not meet too many delays. The gardener awaits its coming somewhat impatiently, but he who is wise is hastening to prepare for the arrival.

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Box 382
Denver, Colorado

MY JUNGLE STUDY

(Continued from page 96)

snake is a snake. Emesia was our cook, and a mighty capable cook, too, and all the better for so clearly understanding that her "doctors" did not live on fried plantain and frijoles alone. Emesia would have made as good a "doctor" (all of us were *doctores* to her) as any of us.

Once *Spilotes bullatus* was caught and somewhat dubiously named, there was nothing to do after keeping him for a time in our menagerie, but let him go back to the jungle. But never again, probably, would I find him in the act of climbing without hands or feet a great, barkless, grey-bleached tree. Emesia's excitement and my own madness for another name had spoiled a pretty story, and how much of good natural history I shall never know.

That dead tree rose out of the ravine probably a hundred feet into the air. In the stubs of branches at the top a pair of Pucheran's woodpeckers had a nest, and a pair of cotingas—*Tityra costaricensis*. Their young must have been nearly grown by this time. Was the snake going up that tall tree for the nestlings? Had he, crawling about the base of the tree, heard the cheeping of the young birds so far above him in the resounding wood? And could he have succeeded in making the grade? These and more are the questions that began to pester me the moment I had the reptile in a cage and duly tagged in Latin. Life has its satisfactions, but after-thoughts are not among them.

I may not be able to explain the lure of the jungle, and the wonder of Barro Colorado Island jungle especially, but I should be able to explain the jumpiness of my pen and the difficulties of concentration with it behind the open windows of my jungle study here on this Island reservation. At least the Nature-minded of my readers will understand, why, in the cool of the twilight, when I can write, I shift my table to the water-side and begin to watch the Inlet down below for the sight of a big ten-foot alligator, a real man-eater should he become perverted, who at this magic hour noses his way, like a submerged cayuca, from shore to shore across the cove. Man-eaters appeal strongly to me from inside a safe study; and there is something about a big alligator, a lure about one swimming through the twilight that is stronger than paper and pen. Since the snake-man came, who hunts alligators by flashlight, the big fellow has gone over to the other side of the Island. He may have gone to mourn, however, for his mate has been recently killed for catching Miguel's chickens here in the cove; and it may be to think about the scientists who have multiplied in the cove, a species of insect, resented not only by the big alligator, but by the jungle generally. The old saurian's disgruntlement has not forwarded the work of my pen, however, because now I am watching all the more intently for his return.

The strangeness and beauty of the scene from my study windows by day, the mystery and awesomeness of the close-drawn jungle by night, are impossible to make real on paper. There is no escape from them within these meager-windowed walls. Shapes and shadows crowd about me and look in upon

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Among the many natives of our woods there are some that refuse to feel at home when transplanted, while others mingle readily with our cultivated garden inhabitants. We consider the following a real acquisition for any garden:

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Just as the débutante experiences new thrills as she wears her first "Orchid corsage" so you, home gardeners, will be thrilled when you view "honest-to-goodness" wild cousins of these rare hothouse flowers in your own garden. It is easy to grow them. Partly shaded, well drained situations, with soil holding leaf mold or humus, are the ideal combination for them.

C. pubescens. Pale yellow flowers during May and June.

	Each	*10*	*100*
1 to 2-crown plants	$ .30	$2.50	$20.00
3 to 4-crown plants	.50	4.50	40.00
Large clumps, 5 to 8 crowns	1.50		

C. acaule. Also called Moccasin Flower. Single, rosy-purple flowers on 12-inch stems.

	Each	*10*	*100*
1 to 2-crown plants	$ .25	$2.00	$15.00

C. spectabile. The showiest of the three. Large, rosy-purple flowers sometimes turning white. Prefers moist, rich soil in shady places.

	Each	*10*	*100*
1 to 2-crown plants	$ .35	$3.00	$25.00
3 to 4-crown plants	.75	6.50	60.00
5 to 8-crown plants	1.50		

Mertensia virginica. The charming Virginia Cowslip. Plants vary from 12 to 24 inches high and bear lovely sprays of flowers, pink while in bud, turning blue or white later. Glorious in the Tulip border or among the Daffodils. Thrives readily anywhere. ***$1.00 for 5; $1.50 for 10.***

Trilliums. The three-leaved Night Shade, one of the earliest bloomers, and among them, *Grandiflorum* is the prettiest. The 2 to 2½ inch white flowers turn to lilac later. Prefers shady, moist situation. ***$1.00 for 10; $6.00 for 100.***

Hepaticas. Are among the earliest Spring flowers, blooming frequently when snow still lingers. *H. acutiloba* bears white, pink or purple flowers. *H. triloba* has pink and dark purple flowers. Price of either variety ***$1.00 for 5; $1.50 for 10.***

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me from the dark. I can hear the stepping of hoofed and padded feet, and the chatter of monkeys, too uncomfortably like myself, and so much wiser in jungle ways than myself, in the tree tops above my iron roof!

The other night we heard the deep, muttered growl of some big cat near the laboratory. He was on a trail over which I had come stumbling with the hastening dusk. We all slipped outside and stood on the brink of the ravine listening, but heard only the tiresome spectacled owl, and *Nyctidromus* the goatsucker, and little *Hyla gabii* down among the puddles far below. Our ears were straining, however, for the roar of the jaguar, or for the higher wail of the puma, the real author, more likely, of the cry we had heard. All was silence. The puma desired not our eager audience, and refused to perform. But it happened to be the moment for the tinamou, and suddenly, as if the Pleiades had fallen and burst into song, this master flutist of the jungle broke in upon the blackness and hush of the night.

The shock was devastating. Our expectancy, planted and tamped like a charge of nitro-glycerine, exploded at the first pure note of the bird by sheer friction of contrast. So I have seen a single scarlet blossom of the passion vine pendant in a spot of sunshine within the dusky gloom of the forest, and over the burning flower, in the center of the golden light, the hovering of an emerald and amethyst hummer—expressing the genius of the jungle, and explaining somewhat its adventure, its excitement and lure. The trade winds are steady; the temperature is regulated by a set thermostat; the rainy and dry seasons come and go by calendar as certainly as New Year's Day and the Fourth of July; but ask a cougar of the jungle and you get a tinamou, for the jungle is a kind of violence, a settled confusion, a constant, startling contrast.

After we had returned to the laboratory we heard again the throaty cough of the puma, but farther off, and as if from the bottom of one of the rocky stream beds. A few nights later this beast, or another as large, prowling about the laboratory, went down one of the trails, touched the hair wire stretched across the trail and set off the flashlight camera, giving us on the film the actual picture which our sensitive imaginations had conjured up out of the rumbling *Arrah!* in the jungle dark.

Nature Education News

"Cap'n Bill" Vinal sends us a copy of the *News Bulletin* of the Nature Guide School of Western Reserve School. This is a mimeographed compendium of all sorts of interesting facts about doings in the field of Nature Education, about folks in that field and about Nature generally. Unfortunately most of the facts having to do with events of coming interest are of no use to our pages, because a magazine has to "go to bed" so early a lot of coming events have taken place before it appears. We note, however, that the *Bulletin* is entered "as an aid to Nature Education in general and for the schools of Greater Cleveland in particular." Its price is "free to those interested." Write to Cap'n Bill Vinal, Western Reserve University, Cleveland, Ohio.

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VALLEY QUAIL FOOLS THE GAME WARDEN

By Maude Wood Henry

Mr. Albert E. Stillman, San Diego, California, naturalist, counts among his feathered friends a large covey of quail about which he tells this amusing story: "When I moved down on Reynard Hills four years ago, the land was covered with brush. About one hundred quail lived in the nearby canyon and I began feeding them morning and night. Under the pergola which I built in my garden I placed several Indian mortars which I kept filled with grain for them. One mortar was supplied with fresh water. At first the quail were timid, but I soon won their confidence. Now they allow me to approach within a few feet of them when eating. These quail stay about the place during the day and at night they perch in the trees across the street from me.

"This spring one of my neighbors sent word to the game warden that the quail were eating plants in his garden. The warden brought a large trap and soon had my visitors imprisoned in it. He took them twenty miles distant to Camp Kearney mesa and liberated them. Two weeks later, early one morning, I saw the covey walking down the road in front of my house. They had travelled the twenty miles back to their old home. They came right up to me and said: 'We fooled 'em; we fooled 'em', and then started to eat as though they were half famished. The birds have been about the place all summer."

Scout Anniversary

Twenty-one years old and still growing—that is the record of the Boy Scouts of America, which organization attains its majority on February 8. And on the record, also, is to be found a story of accomplishment, of an achievement which has enrolled up to the end of last November 608,655 boys in an organization dedicated to the building of better citizenship, self-reliance and service. In the twenty-one years of its life the Boy Scouts have had identified with them some five millions of men and boys, and in connection with the anniversary an attempt will be made to contact every ex-Scout and Scouter now alive and to find out from him wherein he believes the Scout program has most helped him.

Texas Nature Club

Organization of the East Texas Nature Club with a foundation of fifty charter members has been effected. Mrs. Helen G. Abrams, teacher of biology in the Beaumont high school, has been elected the first president. Other officers chosen were: Henry Edwards of Tyler, first vice-president; Mrs. J. L. Hooks, second vice-president; Mrs. Stuart R. Smith, third vice-president; Mrs. Bruce Reid of Port Arthur, fourth vice-president; Miss Fannie McMunn, recording secretary; Miss Ethel Osborne Hill, corresponding secretary; Mrs. Berta DeBretagne, treasurer. Meetings will be held the first Monday in each month and all persons in East Texas interested in Nature Study are invited to join.

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THE LIFE OF A BURROWING SPIDER

(Continued from page 104)

summer following the first winter spent in hibernation, the young spider grows rapidly and reaches a length of about one half of an inch. Again the winter is spent in hibernation and again there is a long summer of growth and development. In the fall of the third year adult size is nearly attained, but the spiders are still sexually immature. Maturity is reached during May of the following spring. The same burrow is occupied continuously throughout the life of the spider. Enlarged from time to time to keep pace with the growth of the tenant, the diameter of the burrow furnishes an accurate index to the age of the occupant.

The burrowing habit is so well established that, except in the case of the male during the mating season, the turret spider apparently never leaves its hole, voluntarily, more than a few inches. Why should the habit be developed so completely in so few members of the family? Some understanding of its gradual evolution may be reached by a study of the habits of related species. Many of the roving lycosids which boldly stalk their prey in the open, nevertheless retire to the shelter of a stone or other cover at the approach of the egg-laying season and there excavate a shallow pit. This temporary abode or nursery is lined with silk and sometimes the silk is continued along the surface of the ground and against the covering object to form an entranceway. Here at least is the burrowing habit in its incipiency.

The roving lycosids actively seek their prey; the turret spiders wait for their prey to come within striking distance of the burrow. Patience is developed to its highest degree, for the wait is frequently a long one. A few weeks or even months without food seems not to inconvenience them seriously, if water is available, but when the opportunity offers they gorge themselves until their distended hides will hold no more.

The spiders are extremely sensitive to movements in the vicinity of the burrow and the jar of a heavy step will send them scurrying to the bottom while the observer is still ten or a dozen feet away. While in the burrow they are able to detect the slightest movement at the surface and a passing insect treading near the turret may bring them up with a rush. They are easily deceived for a time and will often respond when the turret is lightly touched with a straw. But the most curious response is to light. The spiders may be induced to come to the surface by directing a ray of sunlight into the burrow. A small mirror is useful but the back of a watch or the bottom of a bright tin can will serve in an emergency. The eyes of the old spider gleam with a greenish yellow light visible at a depth of a foot or more and even the tiny eyes of the young reflect the light in a thousand gleaming points. If the light is flashed to the bottom of the pit, then gradually moved upwards, the spider responds by slowly ascending the walls of the burrow until she comes to rest at the entrance with her legs tucked beneath her. Sometimes the ascent is interrupted by long pauses which try the patience of the observer who, kneeling over the burrow, is obliged to keep very still.

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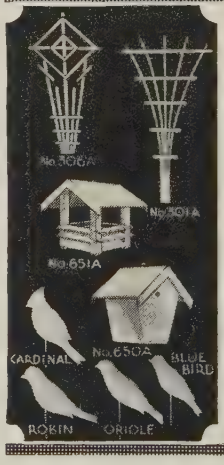

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QUESTING FOR CARIBOU

(Continued from page 84)

Here we could see better, but it would be necessary to raise the camera above the firs, and he could see it. Still the wind favored us. Slowly I raised the tripod legs. I sighted through the finder. The great antlered bull saw me and stopped eating the snow, poised for instant flight. The favoring breeze dropped. Some little whiff of our scent must have reached him, for he seemed about to turn and run. The breeze came again, and we lay motionless. Now Walter crawled around to whisper that he and Brownie were going to try a circle on the other side. He disappeared. Presently the bull turned his head in their direction. He heard or saw them now, too. He trotted off over the ridge. The stalk was over.

There are thrills and disappointments in camera hunting. There is humor, too. Well we knew that one great old bull often came out at dusk in the meadow where our horses pastured, and hopefully had we stalked him in vain. One afternoon as I walked near camp, a pair of huge antlers appeared behind a great rock. They swayed slightly from side to side. A moment more, and I should be face to face with the king of the herd. My knees shook. I took a firm grip of my camera and crawled slowly forward. Now at last I had him. I lifted the camera and held my breath. The antlers moved, and from between them rose a human face—the grinning countenance of Walt. He had found the old horns in the bog behind camp. Ernest Thompson Seton tells how the Indians used a caribou skin and horns to stalk their prey and fool even the caribou. Two men, one behind the other, trained in caribou habits, could sometimes work their way with this ruse right among the herd.

For a week we hunted, but game grew daily more scarce. The caribou were on the move. They resented our harmless pursuing, for every shot we got with the cameras meant frightening the subject. The mountain caribou range the wide open upper meadows and alpine basins in summer, where there is no shelter for the stalking human, nothing of which to build a blind. The last day's hunt discovered only one lone cow, and she was too suspicious for us to approach. Accordingly, one morning the packing began. Our long file of horses twisted and wound in great serpentine curves across the muskeg flats, and we left the Tonquin Valley behind.

Waterfowl for Sportsmen

American Waterfowl, by John C. Phillips and Frederick C. Lincoln, is a book written by sportsmen, for sportsmen. Dr. Phillips is a lifelong follower of shooting, and is also an accomplished naturalist and a Nature lover of rare discernment. Mr. Lincoln is a keen student of birds, and is in charge of the bird-banding work of the Biological Survey.

The main purpose of the book is indicated in the introduction: "Unless the more intelligent sportsmen can be made to give serious and immediate attention to the many adverse factors which today confront our most valuable wildfowl, we believe it soon will be too late to save these birds in numbers sufficient to be of any real im-

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portance for recreation in the future."

We recommend that sportsmen embrace the privilege of reading carefully the entire book. We, naturally, must consider it from the standpoint of the non-shooting Nature lover. Since this class of citizens is not considered as having any stake in our wildfowl, we must read between the lines in some cases to discover the points we shall make, premising, at the same time, that these points may be worthy of consideration by the sportsman also, since they concern vitally his supply.

There is in the book a certain amount of complaint against restrictions imposed on sportsmen, this stand being defended by a method of reasoning difficult of appreciation by the lay mind. Here and there it is intimated that the sportsmen should dictate the details of restrictions. However, we find everywhere evidence that this method, which has long been in operation, has not worked out very well. The duck hunters have increased to about two million, while the supply of ducks annually available is estimated to be about twelve million, we are told. With only six ducks to each hunter, it would seem that added restrictions would tend to benefit the quality of the sport, for surely there cannot be much enjoyment attendant on the taking of half a dozen ducks under easy conditions! Can it be that the "sport" consists in competing for the ducks that belong to brother sportsmen, not to mention those claimed with equal justice by the one-hundred-odd millions of non-shooters, each of whom is the potential owner of about one-tenth of one duck?

The book has chapters on breeding and wintering grounds, migration, drainage, shooting, poisons and diseases, natural enemies and pollution, general conservation, food plants, methods of taking and their ethics, and a brief general treatment of the various species. It is gratifying to note that the authors discount the popular idea that predatory birds and mammals are responsible to any important extent for the decrease of waterfowl. Shooting is given first place as a destructive agent. The average present-day hunter is a poorer shot than his father and knows vastly less about the whole game. Consequently he shoots more ammunition, cripples and wastes more ducks, and bags fewer, a vital factor to be considered.

But it costs more to shoot than formerly ($300,000,000 for all kinds of hunting, Phillips says), and this is apparently the real reason why so much hunting is done, "for we must not forget for a moment that conservation will in the final analysis always have to contend with what is best economically for the average person". Three hundred millions expended annually for hunting is a tidy sum, but if we are average persons we believe that the wild life being destroyed for sport is worth to each of us esthetically and financially much more than two dollars and fifty cents. But this is idle reasoning, for the millions go to a relatively small number, many of whom will do almost anything for a dollar, except to work.

American Waterfowl, from whatever standpoint it is approached, is one of the most important books on a game group ever issued. It is published by Houghton-Mifflin Co., and costs four dollars and fifty cents.

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Animal Pets

The swing in education is away from books toward experiences. Botanies are set aside for walks to the frog pond; zoologies grow dusty while children study the animals themselves in the zoo. A foremost leader of this more valuable type of education is Bertha Chapman Cady, Executive Secretary of the Coordinating Council on Nature Activities, and her brochure, *Animal Pets*, represents both her ideas and the results she has obtained from putting them into practice. Pets at home or in the school, she says, teach self-reliance, kindness, and methods of observation, and foster intelligence. They furnish the basis on which may be built the story of all life. Teachers and parents will find much to guide them in her chapters dealing with her experiences as a teacher who allowed her children to adopt a rabbit; they will probably be amazed to find that one small pet can bring so much knowledge to the fore and so strongly develop the character of the young. The book is published by the Slingerland-Comstock Company, Ithaca, New York.

Feed the Birds

Due to drouth, food supplies for quail, grouse, pheasants and other upland game birds, have been seriously reduced, and all birds lovers are urged by the Biological Survey of the U. S. Department of Agriculture to feed them this winter. Conditions this winter may be the most critical in many years for the birds. Effective feeding methods are: leaving standing and shocked corn in the fields, providing grain in the sheaf, opening straw stacks regularly, spreading manure in the fields daily and scattering threshed grain with it, placing wheat and other grain in sheltered feeding places, and feeding ear corn. The Survey has issued a leaflet on feeding which will be sent free upon request.

Save the Birds

Drastic reduction in hunting must be made this year or migratory gamebirds, hard put to find a living under the drought conditions of the past few months, will be given a blow from which they can hardly recover, both Paul G. Redington, Chief of the Biological Survey, and Dr. T. Gilbert Pearson, president of the National Association of Audubon Societies, stated recently. Mr. Redington has appealed to the sportsmanship of hunters to cooperate with Federal and State authorities to preserve the birds, and Dr. Pearson has stated that "it is absolutely essential for the preservation of an adequate breeding stock of wild fowl that there be substantial reduction in the amount of shooting of ducks and geese during the season." How well the sportsmen will respond is a question, the answer of which will reveal the quality of their sportsmanship; but it is clear that such an appeal would not be made unless an emergency threatening future hunting existed.

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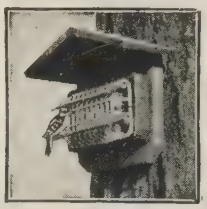

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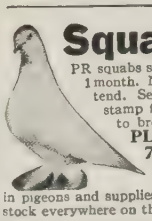

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THINGS TO THINK ABOUT

A PAGE DEVOTED TO CONSERVATION FROM VARYING ANGLES

Protection for Koala Bear

Friends of conservation generally, and of this interesting and much persecuted Australian mammal, in particular, will be glad to learn that our market is closed to skins of this species. It is believed that many skins, illegally taken following a brief open season in certain areas, are being held in Australia, in the hope that the ban on their export may be lifted.

By virtue of Treasury Decision No. 44413, the Commissioner of Customs of the Treasury Department on November 26, 1930, issued the following order:

"To Collectors of Customs and Others Concerned:

"The American Consul General at Sydney, Australia, has advised the Secretary of State as follows:

'At the present time there does exist an Australian law prohibiting the export of skins of any animal other than domestic animals, except with the consent in writing of the Minister for Trade and Customs. It is the policy of the Minister not to grant permits for the exportation of Koala Bear Skins. An exception was made during the period August 8, 1927, to November 10, 1927, and permits to export granted in respect of such skins obtained in the State of Queensland as a consequence of the Government of that State having declared an open season for Koalas for the month of August, 1927. Since November 10, 1927, the Minister has not authorized the exportation of Koala skins from this state.'

"In view of the foregoing, you will not permit entry of skins of Koala Bears exported from Australia and will seize the same whenever they are imported hereafter, unless the importation is in compliance with the provisions of Section 527 of the Tariff Act of 1930.

APPROVED: November 26, 1930
(Signed) Ogden L. Mills,
Acting Secretary of the Treasury.
(Signed) Frank Dow,
Acting Commissioner of Customs."

Woodcock in Missouri

Woodcock are permitted to be shot in Missouri from November 10 to December 10. We are gratified to learn, however, that the state, in view of the well-known general decrease in the numbers of this bird, is anxious to help a little in its protection. In a statement issued by the State Game Department in the early part of the 1930 hunting season, hunters of quail were requested to refrain from shooting any woodcock that they chanced to put up. In view of this praiseworthy attitude toward the bird, it is hoped that Missouri will soon see fit to join the ranks of those few states that have closed the season entirely in its favor.

A certain degree of abundance of the woodcock in the northeast has led to its continued hunting in most of our eastern states, but it should soon be evident, even to the enemies of the bird, that this section cannot continue long to furnish a stock sufficient to supply the gunners of the Atlantic slope. Our people seem slow to realize that the migratory bird law was designed to protect undue exploitation of just such birds—those migrants not generally distributed in the breeding season, and which in their flights must subject themselves to persecution in many states.

Waterfowl and Hunters

There are lessons to be learned from the pages of a recent book on waterfowl, written by well-known sportsmen-conservationists, and reviewed elsewhere. Waterfowl hunters are estimated to number about two million. The ducks and geese estimated to be available each year for their hunting are about twelve million. With only six ducks or geese, on the average, coming to each hunter, it is not at once apparent why the duck hunters are justified in expending the vast sums, probably a hundred million dollars, that are necessary to maintain club-holdings, to hire guides and transportation, to support flocks of live decoys, to buy guns and ammunition (not to mention many more items), and to spend the time necessary to follow the sport. Some may be curious to know why open seasons of three months or so are necessary; why large flocks of live decoys; why so many tons of food need be put out; why repeating guns are needed; why sink-boxes need to be employed—all for six ducks each. We do not know the answers to any of these questions, should they be asked, unless the sport consists in trying to get some of the birds that in equity belong to the other hunters. And if this should be the answer, we would be tempted to ask another question of our own: How does it happen that all the ducks and geese in the United States, with a population of, say, 130,000,000, belong entirely to 2,000,000 hunters?

Radio Aids Destruction

During the last days of the passenger pigeon the telegraph was invoked to spread the news of the movements of the flocks, and the slaughterers were aided in their work of extermination. We note that some of our states are now using the radio to apprise hunters of the progress made by the southward migrating ducks. From the use of the method within states the movement has been extended to include service to other states along the path of migration. We thought that the refinements of decoying and baiting, aided by blinds and the high efficiency of weapons, all conspired sufficiently to reduce the diminishing supply, but it seems that each development of science is to be requisitioned.

Mammals and Forests

The voles of New York State and the relationship of mammals to the Harvard forest form the subject of the most recent Roosevelt Wild Life Bulletin, published by the Roosevelt Wild Life Forest Experiment Station. Robert T. Hatt, assistant Curator of Mammals, American Museum of Natural History, is the author of both articles. The bulletin may be obtained from the Station at Syracuse, New York, for $1.

Billboard Battle

The new year finds the battle of the billboard being actively waged on many fronts with much attention being directed toward the study made of the approaches to the National Capital through Maryland and Virginia. Next year there will be celebrated the bi-centennial of the birth of George Washington, with nation-wide observances and much convergence of visiting Americans on the Federal City. What would they encounter along the way as they approached their Capital, where millions are being spent to make it the world's city beautiful?

To answer this question a survey was made by Mr. and Mrs. W. L. Lawton, of the National Council for Protection of Roadside Beauty. The study was under the auspices of the American Civic Association, with the American Nature Association cooperating by publishing the report of the survey as it has done with the North Carolina and Oregon studies. The answer was startling, revealing a condition on the various approaches distinctly unworthy of their destination—the National Capital.

Covering the area extending about twenty miles around the District of Columbia, and generally considered within the Washington region, Mr. and Mrs. Lawton found billboards, snipe signs, ugly filling stations and equally bad roadside stands crowding along the roadsides. Barred by zoning legislation within the District, organized billboards crowd at the entrances, making the beautification of these immediate entrances impossible. They surround the memorial peace cross at Hayttsville, Maryland; they mass at the Virginia ends of the Potomac Highway, Key and Chain Bridges; they stand in serried ranks along the stretch where the Annapolis Defense Highway enters the District. The Baltimore Pike, main artery of traffic from the North to the South, is lined with offending signs and offensive roadside enterprises. This continues on toward the South in Virginia, along the route to Mount Vernon and other historic places.

The study showed that a zoning law has been passed in Maryland to restrict billboards to industrial districts in adjoining Maryland counties. Not being retroactive, this law affects only the future structures and other effort must be extended to take care of the existing offenders.

In Virginia an enabling act permits zoning in contiguous counties, but before these laws may be put into effect billboards are rapidly being erected along some of the most beautiful highways in anticipation of the ban.

The entire survey reveals a total disregard of the beauty of the approaches to the National Capital on the part of the organized outdoor advertising industry, with a large percentage of the signs being those of the organized companies. It reveals the necessity of some reasonable control over filling stations and food stands, to the end that they may be of service but not eyesores. It reveals the need of a clean-up of the snipe signs, most of them illegally erected.

The report is issued under the title, "Highway Entrances to Washington,—the Federal City." Copies are available to interested individuals.

Are doctors' bills too high?

unanimously, laymen will answer, 'es" . . . and yet, as Dr. Miles Breuer nts out in his article in the February GEIA, the cost of a doctor's schooling so high that he could buy a good farm d support a large family on what it ts him for education. Add unto this ce expenses, cost of equipment, re- ted post-graduate courses, and reflect h Dr. Breuer that "the medical pro- sion now has more to give to the blic; and somehow, from somewhere, s greater *value-received* must be paid . Physicians are not financially en- ved nor possessed of independent in- nes. They are compelled to make their ctice pay their expenses." If you uld like to know just what you pay when you go to the doctor, you will eager to read Dr. Breuer's informa- e article . . . in the February issue of GEIA.

To Your Health!

(Other Articles in the February Issue)

e Need Pure Air," says Bernard Behrend, he admonishes us to be "Pure-Air- ded" on terra firma as well as simply -minded" in an airplane. "You Must Act Once in Glaucoma," says Dr. Fasset wards. Do you know what Glaucoma is? ot, you should learn how to protect your- s against one of the most dreadful eye- ases that can afflict you. "Emotion in ily Life" is an article for conscientious hers and fathers. "Alice in Slumberland" l health story for the children. The above only a few of the articles that appear in l February issue of HYGEIA, the Health gazine of the American Medical Associa- . Authentic! Simply written! Beautifully trated! That's HYGEIA. Let it teach you to preserve your health!

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A Much Needed Dictionary

Horticulturists and gardeners in all English-speaking countries will welcome with eagerness the new, concise, authoritative dictionary of gardening and cultivated plant life just published under the title of *Hortus*. It is the result of five years of work on the part of L. H. Bailey, editor of the *Standard Cyclopedia of Horticulture*, and Ethel Zoe Bailey, and is probably one of the greatest achievements of its kind since Dr. Bailey issued in 1902 his Cyclopedia. An annotated inventory of the species of plants and their main botanical varieties now in cultivation in the United States and Canada, the book gives brief indications of uses and methods of cultivation of the plants listed, and has catalogued, cross-indexed and arranged the thousands of names so that little difficulty is encountered in consulting the work. This reference handbook will find its way into every spot horticulture calls its own and will make easier the work of editors, gardeners, and the lay public. This epochal work is priced at $10 by Macmillan, New York.

Holly and Trees

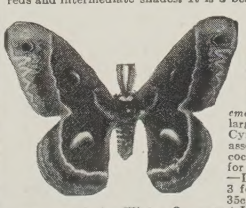
Long has the Wild Flower Preservation Society struggled against cutting, destroying holly and conifer in the name of Christmas. It estimates that nearly two million pounds of holly were shipped from the Delaware-Maryland peninsula alone during the 1930 season, and rightly queries how long the American plant can survive such treatment. In two pamphlets, *Christmas Trees* and *Holly and Its Cultivation*, it suggests the commercial growing of the Yuletide symbols and gives directions for turning a conservation measure to a profit. Interested persons may receive copies at the Society's headquarters, 3740 Oliver Street, Washington, D. C.

Forest Yield Taxes

One of the greatest problems facing forestry has been the unscientific taxing system, which assessed trees as other real estate, on an *ad valorem* basis, and which took no account of the fact that a forest was a crop similar to any other crop. The Chamber of Commerce of the United States, Washington, D. C., has long favored a fairer type of taxation—a tax on the yield —and in a pamphlet, recently issued, discusses the reasons for its view. *Forest Yield Taxes* is primarily a discussion of the different taxing systems in vogue in the several states, with emphasis on assessments on the crop. Every forester and tree-planter will wish to secure this booklet and study it in the light of the taxing problems of his own state.

Cocoons for Nature Lovers

Nothing in the insect world is more beautiful than the giant moths of our large silk-spinning species, with their brilliant colorings of blues, greens, reds and intermediate shades. It is a beautiful sight to see them emerge from their silk cocoons in the Spring, with embryonic wings which in 20 minutes, expand to full size, 3 to 6 inches.



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I am now ready to supply individuals, clubs, educational institutions, etc., with living silk cocoons from which *moths will emerge this Spring*, comprising our large moths: Polyphemus, Cecropia, Cynthia, and possibly Promethea, assorted at these prices: 5 assorted cocoons for $1.00; 10 for $1.75; 15 for $2.25; 25 for $3.50; 50 for $6.00 —Luna moth cocoons, 70c each— 3 for $1.85. Automeris Io cocoons, 35c each, 3 for $1.00. In warm room some emerge during Winter. On request I will include actual sample wings of 3 of these moths FREE to new purchasers who order 10 or more cocoons now. 3 sheets of color photographic reproductions suitable for framing, showing life histories of 5 of these moths will be supplied for 35c additional. Rare tropical butterflies 70c each, unmounted, six different kinds 60c each—in glass topped Riker mounts, expanded, 50c per specimen additional. *Ideal for nature study classes, kindergarten, boys and girls nature scout groups, schools, colleges and beauty-loving individuals. Transportation paid. Remit to*

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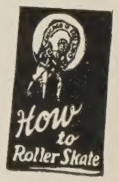

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Long Beach Club

Dedicated to the stimulation of interest in Nature study in Long Beach, California, the Agassiz Nature Club of that city has decided to take out articles of incorporation, the better to permit it to carry on its work. One of the fundamental ideas of the Club is that a better citizenship may be assured through a real knowledge of Nature and that a happier citizenry is the inevitable result of such knowledge. The Club was organized in 1923 and has had a successful and active existence. At its recent meeting Earl W. Wood, local attorney, was elected president. The other officers are: Mabel Gray Best, vice-president; Elizabeth Byrkit, secretary-treasurer; Daisy L. Reed, corresponding secretary. Mr. Wood and Mrs. Wood have planted, classified and have growing at their mountain cabin in the San Gabriel Mountains more than three hundred species of native California wild flowers and flowering shrubs.

Steel Traps Barred

In one of the greatest demonstrations of public feeling for animals ever registered at the polls, citizens of Massachusetts overwhelmingly passed the anti-steel trap bill by their referendum, November 4. The vote was 589,013 in favor of the restrictive measure, and 259,014 against. With the counting of the final ballots, the steel trap made its last bow in the Bay State. Led by Francis H. Rowley, president, Howard Noble, managing director, and, principally, Mrs. Edward Breck, widow of the late Lt.-Commander Breck, who founded the national league, the Anti-Steel Trap League, Massachusetts Division, performed a lion's share of the work to bring victory. Massachusetts did herself proud at the ballot-box, and other states may without fear follow her example.

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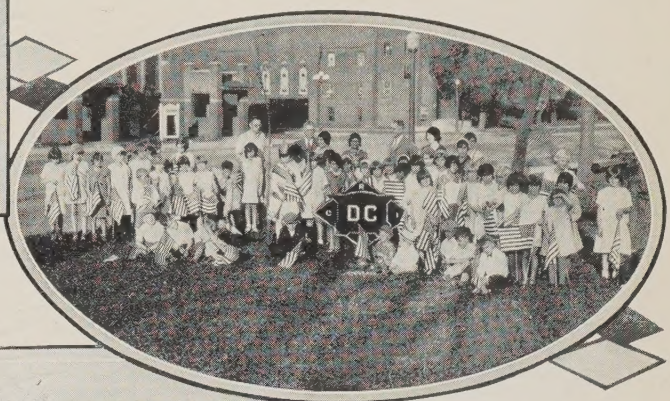
Tree Army Gets Thousands of New Members

Trenton group that took part in the Rock Island Railway anniversary program held in the City Park

ONE of the biggest registrations of tree planters in the American Tree Association comes from the Diamond Clubs of the Rock Island Railway. The children of the road's workers all along the line marked the seventy-fifth birthday of the road and inaugurated the first of the clubs' bicentennial tree planting in memory of George Washington. In his message to the tree planters J. E. Gorman, president of the Road, extended congratulations to the tree planters on their good citizenship.

(Upper Left) Shawnee Diamond Club holding program at Rock Island Station Park

(Lower Left) Fairbury group planting trees and observing anniversary



(Above) Estherville celebrating the anniversary in the City Square Park

(Left) Silvis group at Scout Grounds planting trees with a fine program in honor of Washington. Any tree planter can join the American Tree Association in Washington, D. C. by registering his trees on the Association's national honor roll. All of these tree planters have received their certificates of membership

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Henderson's Invincible Asters

Brilliant Mixture Poppies

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These 6 packets are all seeds of our own introductions, and are among our most famous specialties—Ponderosa Tomato, Big Boston Lettuce, Early Scarlet Turnip Radish;—Invincible Asters, Brilliant Mixture Poppies and Giant Waved Spencer Sweet Peas. These, like all Henderson's Seeds, are tested seeds.

For 84 years, HENDERSON'S TESTED SEEDS have been the standard. Year after year, our constantly improving methods have enabled us to maintain our supremacy among American seed houses. The initial cost of your seeds is the smallest item in your garden's expense, and it is of advantage to plant seeds of recognized quality from a house of reputation and standing.

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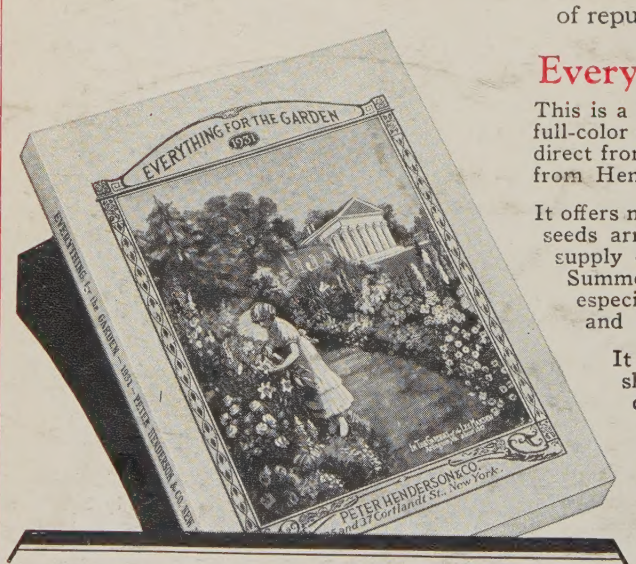
With every catalogue will be sent our Henderson Rebate Slip which, returned to us, will be accepted as 25 cents cash payment on any order of two dollars or over.

In addition we will include with your order, without charge, the Henderson specialty collection of three packets of vegetable and three packets of flower seeds as described above.



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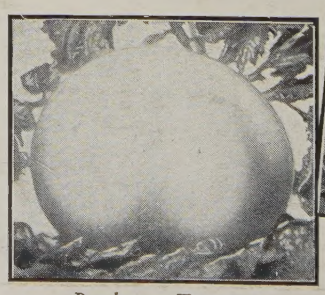

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